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ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING, INCLUDING INDEX TO GEOPHYSICAL ABSTRACTS NOS. 33 TO 44

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1173) ON THE INFLUENCE ON GRAVITY VARIOMETER READINGS OF CHANGES IN TEMPERATURE CONDITIONS DURING THE OBSERVATIONS (IN RUSSIAN)

By D. G. Uspenski

Bulletin of the United Geological and Prospecting Service of the U.S.S.R., vol. 60, No. 24, 1932, pp. 391-399.

The mechanism of convection currents produced by temperature changes during the observations and causing the displacement of the zero point of the torsion balance is discussed. Based on his experiments, Uspenski shows that there is a linear dependence between the minimum displacements of the zero point and the rapidity of temperature changes.

The dependence between the maximum displacements of the zero point caused by heating and cooling and the height of suspension of the lower load relative to the protecting tube is shown in a figure. The author takes 35 centimeters as the optimum height in the models tried out (large Bamberg's model No. 87, 1927, and Bamberg's model No. 533, 1930).

Figures showing the results of the application of the experience of the laboratory work to field practice are given in a table. According to this table, the per cent of doubtful observations with respect to the displacement of the zero point was reduced from 11.4 to 6.6 per cent and the per cent of bad observations from 15.2 to 3.0 per cent.

The experiments carried out in the gravimetric laboratory are continued. --W. Ayvazoglou.

2. MAGNETIC METHODS

(1174) THE TRUTH ABOUT THE MAGNETOMETER

By Wm. M. Barret

Oil Weekly, Houston, vol. 66, No. 7, 1932, pp. 27-30.

Headings of the article: (1) Popularity and early use of magnetometers; (2) basic principle of magnetic prospecting and origin of the "high" theory; (3) difficulties encountered in mapping sedimentary structure.

In the first part of this paper the author described the circumstances under which the several geophysical instruments, and particularly the magnetometer, were so crudely applied during the early explorations in this country. After this he endeavored to point out the manner in which the magnetic "high" theory was so logically conceived and so illogically extended to interpret sedimentary structural condition. A brief outline of the more important variables that enter into the problem of assigning geologic significance to magnetic anomalies is presented.--W. Ayvazoglou.

(1175) GREAT WESTWARD EXPANSION OF THE RAND

Editorial note

South African Mining and Engineering Journal, Johannesburg,
vol. 43, No. 2135, 1932, pp. 101-103.

The author of this article refers to the tracing of the expansion of the and by means of magnetic methods of prospecting. The work was carried out by r. Krahmann and the results of the detailed geological study of the area efinitely confirmed those obtained by magnetic measurements.--W. Ayvazoglou.

(1176) ERGEBNISSE MAGNETISCHER UNTERSUCHUNGEN IM VULKANGEBIET DES LAACHER SEES IN DER EIFEL

(RESULTS OF EARTHMAGNETIC INVESTIGATIONS IN THE VOLCANIC REGION OF LAKE LAACH IN THE EIFEL)

By W. Ahrens

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 4, 1932, pp. 320-336.

In the volcanic district of the Lake Laach in the Eifel, extensive investigations have been made with A. Schmidt's vertical field balance. Z-values up to 500 γ have been ascertained above streams of basaltic lava of about 10 to 15 meters of thickness, even under a cover (loess and trachytic tuffs) of more than 20 meters. At a greater thickness and thinner covering layers, these values increased to more than 2,500 γ. Still greater were the anomalies above basaltic scoria mountains and crater walls (more than 5,000 γ). The tuffs, especially the gray Laach trachyte tuffs, also proved to be strongly magnetized. On small domes, consisting only of these tuffs, up to 900 γ were measured. All occurrences are magnetized in accordance with the earth's magnetic field. Such surveyings of magnetism are of great practical importance to the basalt industry, as all searching work can be shortened and made cheaper. However, an intimate knowledge of the geological conditions, on account of the strong magnetizability of covering tuffs, is necessary for the interpretation of the results of measurements.--Author's abstract.

G.A. No. 45.

(1177) DER TIEFERE UNTERGRUND DES SUBHERZYNEN BECKENS UND SEINES NORDWESTLICHEN VORLANDES AUF GRUND MAGNETISCHER MESSUNGEN

(THE DEEP SUBSOIL OF THE SUBHERZYNE BASIN AND OF ITS NORTHWESTERN FORELAND AS BASED ON MAGNETIC MEASUREMENTS)

By Otto Keunecke

Gerlands Beiträge zur Geophysik. Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 4, 1932, pp. 344-373.

The magnetic measurements of the vertical intensity carried out in the "Subherzyne Becken" show a decrease of the magnetic intensity from southeast to northwest at about 200 γ thus proving the gradual sloping of the deep primitive rocks, as established already by geological investigation. The palaeozoic borders of the Becken, Harz, Flechtinger Höhenzug (North Germany), and Paschleben Grauwacken projection are not manifested in the isanomal (equal gravity disturbance) picture by a sudden and great increase of intensity but show only a small gradual increase of γ-values owing to the fact that the primitive rocks producing magnetic effect are lying there higher. Therefore the rocks producing the highest magnetic effect are to be expected still deeper, certainly in the crystalline subsoil.

A magnetic disturbance, coming from the Harz, has been established in the southeastern part almost following the direction of the strike through Halberstadt-Oschersleben; this is probably caused by a fault in the deeper subsoil.

In the northwestern part of the "Subherzyne Becken" the course of the isanomalies indicates a greater partition of the primitive rocks, probably into wedge-shaped lumps. From the course of the isanomalies in the Allertal it can probably be concluded that the negative anomalies are not produced by the effect of salt but are due to the vertical displacement of the parts of the primitive rocks. The location of salt domes by means of magnetic measurements of the vertical intensity can indirectly be eventually established by the fact that the northwestern German salt domes are closely connected with the tectonic of the primitive rocks.

The article is divided into the following main parts: (1) Purpose of the investigation and location of the region of investigation; (2) geology of the "Subherzyne Becken" and of its northwestern foreland; (3) carrying out of magnetic measurements; and (4) results of the magnetic survey.

An index giving 76 articles of reference is added.--Author's abstract.

(1178) BERICHTIGUNG ZU: DER TIEFERE UNTERGRUND DES SUBHERZYNEN BECKENS UND SEINES NORDWESTLICHEN VORLANDES AUF GRUND MAGNETISCHER MESSUNGEN

(CORRECTION TO: THE DEEP SUBSOIL OF THE SUBHERZYNE BASIN AND OF ITS NORTHWESTERN FORELAND AS BASED ON MAGNETIC MEASUREMENTS)

By Otto Keunecke

erlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
vol. 3, No. 1, 1932, pp. 137-142.

In this article the author corrects the mistake made in the calculation f the γ-values published in the article under the same title in vol. 2, o. 4, 1932, pp. 344-373 of the Ergänzungshefte (see preceding article).

The first paragraph of the abstract should read, according to the author, s follows: The magnetic measurements of the vertical intensity carried out n the "Subherzyne Becken" show that the magnetic intensity in the area of he "Subherzyne Becken" is higher than in its northwestern foreland and drops harply at the northwestern borders of the mountain ranges of the Gr. allstein, the Asse and the Elms, in the region of the Okertalniederung and the ontinuation of this line--the A. Kumm's Braunschweig axis. The palaeozoic orders of the Becken, Harz, Flechtinger mountain range and Paschleben rauwacken projection are not manifested in the isanomal picture by an in-rease of the intensity and therefore allow us to draw the conclusion that he rocks producing magnetic effect are deeper, and certainly can be expected n the crystalline subsoil.--Author's abstract translated by W. Ayvazoglou.

(1179) VARIOMETRISCH BESTIMMTES MAGNETISCHES PROFIL OFFENBURG-CHIASSO; FOLGERUNGEN ÜBER SÄKULARE ÄNDERUNGEN; EINFLUSS VON GESTEINSSUSZEPTIBILITÄT UND TEKTONIK

(MAGNETIC PROFILE OFFENBURG-CHIASSO DETERMINED BY VARIOMETER; CONCLUSIONS ON SECULAR VARIATIONS; INFLUENCE OF THE SUSCEPTIBILITY OF ROCKS AND OF THE STRUCTURE OF THE EARTH)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
vol. 2, No. 4, 1932, pp. 374-400.

The accuracy of determinations for magnetic anomalies in horizontal ntensity, H, and vertical intensity, Z, using the author's variometer, is ow as good as that obtained by absolute measurements. The variometer can e used accurately without resetting for determinations on lines as long as 00 kilometers in the north-south direction. The question as to whether ocal anomalies may be affected by secular variations is discussed. heoretically. An attempt to check the theory developed using previous ob-ervations of intensity gives no definite conclusions; absolute measurements of inclination with the dip needle are not of sufficient accuracy to give a reliable test. In the study of a deep-seated regional anomaly and in the preparation of land magnetic charts, it is found best to discard all values at stations where the adjacent rocks have differences of susceptibility of more than $2 \cdot 10^{-4}$. On the magnetic profile Offenburg-Chiasso only very few and very weak anomalies of Z and H are located in the northern and central Alpine region and in the Swiss Jura. In the South Alps (overthrusted gneiss of Ticino) there are some larger anomalies. In the Rhine Valley north of the Alps between the Black Forest and the Vosges big anomalies are situated; the depth of the center of the disturbing rock of this anomaly is about 7 to 12 kilometers. Some profiles in the direction of the Alpine striking have only superficial anomalies, which are directly connected with the observed magnetic susceptibility of the adjacent rocks. Tectonic lines in the Alps are often without any influence on Z and H; so with the Tonale line near Bellinzona.--Author's abstract.

(1180) BERICHT ÜBER DIE MAGNETISCHEN ARBEITEN DES GEOPHYSIKALISCHEN INSTITUTS LWOW, 1928-1930

(REPORT ON THE MAGNETIC SURVEY WORK OF THE GEOPHYSICAL INSTITUTE OF LWOW IN 1928-1930)

By Edward Stenz

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, vol. 2, No. 4, 1932, pp. 409-426.

In this paper a report on the magnetic survey work of the Geophysical Institute of Lwow University made in southeastern Poland in 1928-1930 is given. A map is given of anomalies of the magnetic inclination in the vicinity of Lwow, according to the measurements carried out by H. Orkisz and by the author in 1928. The area of the surveyed region was 2,250 square kilometers, the number of stations 242. This survey shows a relationship of several anomalies (in particular of the Szolomyja anomaly) with the escarpment of Roztocze. In 1929 a temporary magnetic station in Daszawa, near Stryj, was installed and in 1929-30 an absolute magnetic survey in the surroundings of Stryj was made (308 stations of I, 158 stations of H, and 65 stations of D, in an area of 5,060 square kilometers). One part of the results of the records of the Daszawa magnetograph is given in a table. The distribution of the anomalies of inclination, and the distribution of declination for the epoch 1930, 5, and that of the anomalies of declination in the vicinity of Stryj, are shown in figures. A large but feeble anomaly in the Carpathians of Skole, and another along the northwestern escarpment of the Podolian plateau is marked. Finally the author gives some remarks concerning the detailed relative measurements of the vertical intensity (area -- 2,190 square kilometers; distance between stations -- 1 kilometer) completed for prospecting purposes. The results obtained with two A. Schmidt's balances are mentioned also.--Author's abstract.

(For previous reports on the magnetic survey work of the Geophysical Institute of Lwow, see Geophys. Abs. 11 and 35.)

3. SEISMIC METHODS

1181) ZWEI MERKWÜRDIGE WELLENGRUPPEN BEI EINIGEN ERDBEBEN IN KWANTO UND DIE DRITTE MITTEILUNG ÜBER DEN FORLAUFENDEN TEIL DER ERDBEBENBEWEGUNGEN

(TWO REMARKABLE WAVE GROUPS OBSERVED DURING SOME EARTHQUAKES IN KWANTO AND THE THIRD REPORT CONCERNING THE FORERUNNING PART OF THE EARTHQUAKE MOVEMENTS)

By Takeo Matsuzawa and Takaharu Fukutomi

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 3, 1932, pp. 499-516.

Some earthquakes in western Kwanto, which were believed to be very hallow seated, revealed two particular wave groups, U_1 and U_2. Assuming a in surface layer and these waves as P and S waves in the layer, close con-ections between this and other two phenomena the ($P - P_1$) durations which re discussed by the authors in a previous article and the anomaly of (P - S) ration observed in the case of the Itō swarm earthquakes in 1930 were und.--Authors' abstract.

(1182) ON THE ANGLE OF INCIDENCE OF THE INITIAL MOTION OBSERVED AT HONGŪ AND MITAKA

By Takeo Suzuki

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 3, 1932, pp. 517-530.

1. A remarkable forerunner of earthquake motion obtained at Hongō and itaka has been fully discussed and plausibly elucidated by Professor atsuzawa and others. The present writer has studied the angle of incidence f the first motion and it becomes approximately 4° as the mean value at both tations, its fluctuations being small.

2. From this value of the angle of incidence, 0.5 kilometers per second s determined as the velocity of dilatational wave in the most superficial ayer.

3. The angle of incidence of the first motion seems to vary with its eriod; it is 40° when the period is 0.4 second or so, and 50° when the eriod is about 30 seconds.

4. A few remarks are added to explain some characteristic features of e seismogram.--Author's abstract.

(1183) TILTING MOTION OF THE EARTH'S CRUST OBSERVED AT RYOJUN (PORT ARTHUR)

By R. Takahashi

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 3, 1932, pp. 532-559.

The author gives a description of the observations of tilting motion of the earth's crust due to tidal loads in the neighboring seas of the observation station. The results are shown in diagrams and tables.--W. Ayvazoglou.

(1184) ZU DER ARBEIT VON H. MOTHES ÜBER DIE BESTIMMUNG DER EISDICKE AM HINTEREISFERNER

(CONTRIBUTION TO H. MOTHES' ARTICLE ON THE DETERMINATIONS OF THE THICKNESS OF ICE IN HINTEREISFERNER)

By W. C. Salm

Gerlands Beiträge zur Geophysik, Erganzungshefte für angewandte Geophysik,
vol. 2, No. 4, 1932, pp. 401-408.

With reference to the survey of the "Hintereisferner" (Oetztaler Alps), published by H. Mothes in the Zeitschrift für Geophysik, 1929, No. 3/4 (see Geophys. Abs. 9, p. 13), where seismic prospecting methods have been introduced in order to measure the magnitude of the glacier, it appears that conclusions regarding the reflected waves in this investigation are doubtful.

The author resumes his final results as follows:

1. Without extending the investigations it is impossible to prove in this instance the existence of reflected waves. In view of the latter aim (regarding the comparison with secondary waves) the range covered by the explosions ought to have been enlarged which, on the other hand, might lead here to great difficulties.

2. Due to the Fermat principle the computed magnitude of the layer is obviously related to the shortest distance, to the slope of subsurface valley; the real depth of the bottom however can only be obtained by a systematical layout of the shooting lines longitudinally and crosswise.--Author's abstract.

4.- ELECTRICAL METHODS

(1185) DER EINFLUSS DER ERDBODENEIGENSCHAFTEN AUF DIE AUSBREITUNG ELEKTROMAGNETISCHER WELLEN

(THE INFLUENCE OF THE PROPERTIES OF THE GROUND UPON THE SPREADING OF ELECTROMAGNETIC WAVES)

By M. J. O. Strutt

Hochfrequenztechnik und Elektroakustik, Leipzig,
vol. 39, No. 6, 1932, pp. 220-225.

For the first part of this article see Geophys. Abs. 44. In the esent part the author discusses the field strength on the ground where the lations between all kinds of dipoles are more complicated than in the free ace.

The last chapter deals with the experimental determinations of the roperties of the ground.

A reference list containing 71 papers is added.---W. Ayvazoglou.

(1186) DETERMINATIONS OF THE SALT WATER HORIZONS IN LARGE OIL-BEARING ANTICLINES

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 4, 1932, pp. 337-343.

The author examines Levi-Civita's formulas for electromagnetic induction n an infinite horizontal plane and applies them to the salt water horizons n vast oil bearing anticlines.

The magnitude of the extension of an anticline can be determined in a lane gravimetrically; this makes it possible to apply these formulas after aving transformed them accordingly. By using simple potentiometer phase eterminations the depth of the salt water horizon can be calculated. The hase determinations are reduced to measurements of the maximum effects. he maximum effect is within certain limits a function of the frequency. -Author's abstract translated by W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1187) A VACUUM-TUBE AMPLIFIER FOR FEEBLE PULSES

By L. F. Curtiss

Bureau of Standards Journal of Research, Washington, D. C.,
vol. 9, No. 2, 1932, pp. 115-121.

A resistance capacity coupled 5-stage amplifier is described which is suitable for automatic registration of the primary ionization pulses produced when corpuscular rays pass through a shallow ionization chamber. A discussion of an improved type of ionization chamber is given.--Author's abstract.

6. GEOTHERMAL METHODS

(1188) GEOTHERMAL GRADIENT AT GRASS VALLEY, CALIFORNIA

By W. D. Johnston, jr.

Journal of the Washington Academy of Sciences, Washington,
vol. 22, No. 10, 1932, pp. 267-271.

Johnston gives in this article the results of temperature observations carried out by him in the gold quartz mines at Grass Valley, Calif., during 1930 and 1931. The depth-temperature curve, shown in a figure, is slightly concave toward the depth axis. Temperature gradients at the Empire-Star mine, Grass Valley, Nevada County, are given in a table. According to this table the following values of the reciprocal gradients were established:

From 300 to 1,280 feet, 1° F. for every 168.6 feet
to 2,400 feet, 1° F. for every 175.8 feet
to 3,200 feet, 1° F. for every 186.1 feet
to 3,700 feet, 1° F. for every 189.8 feet.

A comparison of temperatures in various deep mines is given in another table, according to which the thermal gradient at Grass Valley is in close agreement with the thermal gradient at the Mother Lode, Calif., slightly exceeds the gradient in the Rand, S. Africa, and is much less than the gradient in the Michigan copper mines and in the St. John del Rey mine, Brazil.

In a footnote Johnston says, "In A Knopf's article, 'Mother lode system of California' (U. S. Geol. Survey Prof. Paper 157, pp. 22-23, 1929) a gradien of 1° F. for 150 feet is given. These data have been recalculated by the method of least squares by H. C. Spicer who obtained a reciprocal gradient of 192.3 feet per degree Fahrenheit from observations between the depths of 1,575 and 4,200 feet. Knopf's values for the Central Eureka and the Kennedy mines apparently are based on an assumed value of the mean annual temperature Y of the air."--W. Ayvazoglou.

(1189) GEOTHERMAL GRADIENT OF THE MOTHER LODE BELT, CALIFORNIA

By Adolph Knopf

Journal of the Washington Academy of Sciences, Washington, D. C.,
vol. 22, No. 14, 1932, pp. 389-390.

In this article Knopf offers the following objections to the conclusions ntained in W. D. Johnston's article "Geothermal gradient at Grass Valley, lifornia" (see the previous article), pointing out two fundamental errors de during the recalculation of the geothermal gradient at the Mother Lode, de by Spicer: "In the first place temperature observations from two mines ne Plymouth and the Kennedy) situated 10 miles apart were used to compute gradient, but this procedure is not permissible, as the gradients at the o mines are most likely to be different. In the second place it was assumed at the collars of the shafts of the two mines are at the same altitude; the llar of the Kennedy shaft is approximately 1,430 feet whereas that of the ymouth about 1,100 feet above sea level."

A reply in explanation of his conclusions is given by W. D. Johnston in article published in the same number of the Journal of the Washington ademy of Sciences, pp. 390-393.—W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1190) GEOPHYSICAL METHODS OF PROSPECTING

By A. B. Broughton Edge

Journal of the Royal Society of Arts, London,
vol. 80, No. 4144, 1932, pp. 553-579.

Geophysical methods of prospecting, the principle object of which is assist in the discovery of ore deposits, and in the elucidation of ological features of which there may be little or no evidence at the rface, form the subject of this paper.

Magnetic, gravimetric, electrical (surface potential methods and ectromagnetic methods) and seismic methods of prospecting, and instruments plied for these methods, are discussed.--W. Ayvazoglou.

(1191) ETUDES GÉOLOGIQUES ET PROSPECTIONS MINIÈRES PAR LES MÉTHODES GÉOPHYSIQUES

(GEOLOGICAL STUDIES AND MINING PROSPECTING BY GEOPHYSICAL METHODS)

By P. Geoffroy and P. Charrin

Editor: Jules Carbonel, Algiers, 1932.

The preface of this book has been written by Mr. L. Pineau, Directeur de l'Office National des Combustibles Liquides. It comprises 350 pages, and is officially issued by the Government of Algeria (see also Geophys. Abs. 42).

The application of geophysical methods to the study of numerous problems which are encountered in mining exploration and civil engineering has met with increasing success during the past ten years, and it is obvious that this new technique will have a considerable influence on the whole industrial economy. Mr. L. Pineau believes especially in the utility of such methods in the exploitation of solid and liquid fuels.

This book, which represents the experience of more than eight years, is divided into two parts. In the first part, the general principles of the various geophysical methods are discussed: Gravimetry, seismology, electrical and electromagnetic methods, magnetometry, and radioactivity. The second part constitutes an interesting contribution to geophysics, since, in similar works published up to the present time, the authors contented themselves with a theoretical discussion of the methods, followed by some practical examples. Thus it appeared to a nonexperienced reader that all geological and mining problems were amenable to any of the methods of applied geophysics. The authors of the present publication, on the contrary, have indicated and discussed a certain amount of typical cases, and by accurate and well chosen examples have brought into evidence the practical value of the interpretation furnished by each method, thus showing to the reader which method or methods should be adopted in each particular case. Finally, a series of mathematical and technical questions have been treated in several appendices.

To summarize this abstract, the book is clear, sound, and written by practical geophysicists for engineers concerned with industrial geological and mining problems.--E. G. Leonardon.

9. NEW BOOKS

92) Chahnazaroff, D. Les Travaux de Laboratoire Géophysique (Transactions of the geophysical laboratory). Rodez, Imprimerie G. Subervie, 1932. 123 pp., 14 figures, 2 tables. Price, $4. Available from the author, Université Ljubljana, Yugoslavia. The author proposes the investigation of samples of rocks and minerals in a special laboratory in connection with physical properties of the lithology of a given region. Based on these investigations a preliminary decision on the geophysical method for prospecting to be applied can be established. The practical value of this study is discussed by the author in the first part of his book. In plotting specific weights of rocks and minerals on geological maps, geophysical maps (geodensimetric maps) can be prepared. These maps may serve as a basis for gravimetrical work in a certain region. In the third chapter dilatometric properties of rocks are studied (Chevenard's differential dilatometer); this study is considered important by the author from the geophysical viewpoint, as it may allow the solution of some questions of isostasy, as well as the establishment of the thermal history of geological regions. The second part of the book deals with the geophysical study of oil-bearing waters.

Contents of the book: Part 1: Introduction: (1) Importance of geophysical maps; (2) geological and geophysical material of the region of Travnik (Bosnia and Herzegovina). Chapter1: Study of radioactive properties of rocks and minerals in the region of Travnik: (1) Radioactive method of geophysical prospecting; (2) apparatus and method of measurement; (3) results of radioactive studies; importance of this study. Chapter 2: Study of densimetric properties of rocks and minerals in the region of Travnik: (1) Gravimetrical method of prospecting; (2) apparatus and method of measurement; (3) results of densimetric studies. Chapter 3: Dilatometric studies: (1) Apparatus, method of measurements and results obtained. Part 2: Chapter 1: Densimetry of oil-bearing waters; conditions of work. Chapter 2: General considerations on the densimetry of oil-bearing waters. Chapter 3: Practical measurements of the density of oil-bearing waters. Chapter 4: Determinations of the direction of circulation of waters and practical application for the struggle against inundations of oil-bearing strata. Summary and conclusions.

193) Zeitschrift des deutschen geologischen Gesellschaft, Erdöltagung der deutschen geologischen Gesselschaft in Hannover, 5-7 Mai, 1932. Vorträge und Verhandlungen (The Petroleum Conference of the German Geological Society, Hanover, May 5-7, 1932. Papers and discussions). Reprint from vol. 84, part 6, 512 pp., illustrations (Press of Ferdinand Enke, Stuttgart). In this volume papers presented at the German Geological Society and dealing with oil geology and its problems are collected.

(1194) Mager, Henri. Water diviners and their methods. Translated from the fourth edition of "Les sourciers et leurs procédés" by A. H. Bell. London, G. Bell and Sons (Ltd.), 1931, 308 pp., 8 plates. Price: 16 s. net. The author of the brief review of the book, given in "Nature," vol. 130, No. 3284, 1932, pp. 527-528, concludes: "As an up-to-date exposition of the application of the divining rod in all its forms to the location of water, and a description of the new methods recently introduced by the author, the book is both informative and interesting, but many of the statements and conclusions put forward lack conviction and will not be accepted by the physicist without further evidence."

(1195) Matson, R. C. Prospecting and exploration. Department of Mining, Michigan College of Mining and Technology, Houghton, Mich., 1932, 45 pp. Price, 60 cents. Geophysical prospecting takes up the last 20 pages of the book.

(1196) National Research Council, Division of Geology and Geography. Report of the Committee of Submarine Configuration and Oceanic Circulation, presented at the annual meeting of the Division on April 13, 1932, 101 pp., Washington, D. C., 2101 Constitution Avenue. A brief review of the origin, purpose and accomplishments of the committee is given by T. Wayland Vaughan, chairman.

(1197) National Research Council. Physics of the Earth - V. Oceanography. Bull. 85, 581 pp., illustrated. Washington, June, 1932.

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ERRATA

A. 27, p. 190, Art. 313, 2nd line. For "454,767" read "464,767."

A. 31, p. 290, Art. 483, last line. For "Mazos" read "Brazos."

A. 35, p. 400, Art. 682, title. For "REPORTS" read "DEPOSITS."

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of volume 3

.A. No. 46 DEPARTMENT OF COMMERCE February, 1933.

UNITED STATES BUREAU OF MINES
Scott Turner, Director

GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1198) ZUR ERMITTLUNG GEOLOGISCHER STRUKTUREN AUS DREHWAAGENMESSUNGEN, INSBESONDERE VON SALZDOMEN

(ON DETERMINING GEOLOGICAL STRUCTURES FROM TORSION BALANCE OBSERVATIONS, ESPECIALLY SALT DOMES)

By F. Haarstick

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 1, 1932, pp. 29-37.

The position and shape of a mass surrounded by a lighter or a heavier med can be calculated from the gradients and curvature values of the mass, if the specific gravity of the mass and of the medium are known. The value of such calculations depends on the degree of accuracy obtainable. A method is given in this article by which position and shape of structures of simple geometrica form can be determined. The results of calculations are compared with some practical examples on salt domes, and conclusions are drawn.--W. Ayvazoglou.

(1199) SUI PARTICOLARI ASPETTI GRAVIMETRICI DI ALCUNI NUCLEI SUB-PADANI (II)

(CONCERNING SPECIAL GRAVIMETRICAL ASPECTS OF SOME NUCLEI IN THE LOWER PLAIN OF THE PO)

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 1, 1932, pp. 38-44.

The author refers to his previous publication on the same problem (see Geophys. Abs. 36, p. 414) and gives in this article an example illustrating th influence of the gradual change of the density with the depth upon gravimetric results. The author examines especially the case of a cap rock and of tectoni layers, the density of which increases linearly with the depth.--W. Ayvazoglou

(1200) RESULTS OF GRAVITY DETERMINATIONS CARRIED OUT ON THE EASTERN SLOPES OF THE URALS IN 1930 (IN RUSSIAN)

By B. V. Numerov

Bulletin of the United Geological and Prospecting Service of the U.S.S.R., vol. 51, No. 8, 1932, pp. 173-175.

The distribution of gravity anomalies along the profile Zlatoust-Cheliabinsk-Petropavlovsk is shown in a figure, the corresponding data being given in a table.

The importance of the results for the determination of the structure of the Urals mountain chain is emphasized and further investigations are recommended. --W. Ayvazoglou.

(1201) ACCURACY OF DETERMINATION OF RELATIVE GRAVITY BY TORSION BALANCE

By Donald C. Barton

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1235-1249.

Determination of relative gravity by the Eötvös torsion balance has been shown by Oltay and others to be as accurate as the determination by the invariable pendulum. In the present paper, the probable error of the torsion balance determination of relative gravity is calculated from the error of closure of 45 traverses comprising 2,800 stations, most of them in the Gulf Coast region. The probable error of each individual observation in those surveys is calculated to have been ± 2.2 Eötvös units for the traverses taken together, or from ± 1.9 E. for the traverses with the larger station interval to ± 5 E. for the traverses for the small station interval. But the greater error of the individual observations in the traverses which have the shorter station interval has been compensated, intentionally, by that shorter interval, and the probable error of the determination of relative gravity by those 45 traverses is approximately 0.4 milledyne per 10 kilometers of traverse without regard to the magnitude of the probable error of the individual observations or of the station interval. The probable error of the determination of relative gravity between key points in good torsion balance surveys presumably is approximately ± 2.5 to ± 3.5 E. per 10 kilometers air-line distance between the two places. If pendulum determinations of relative gravity are used to supplement and to increase the accuracy of torsion balance surveys, there is a minimum interval at which the pendulum stations should be placed, for at lesser intervals the determination of relative gravity by the torsion balance is more accurate than that by the pendulum. That minimum interval ranges from 100 to 200 kilometers for the pendulum observations of the first quarter of the century to 8 to 50 kilometers for first-class modern pendulum observations.--Author's abstract.

(1202) CURVATURE OF EQUIPOTENTIAL SURFACES

By M. M. Slotnick

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1250-1259.

If one is to have a complete and satisfying understanding of the theory of the torsion balance, it is essential to have clearly in mind a physical picture of the quantities involved. Most authors assume either that their readers are well versed in the differential geometry of surfaces in a Euclidean 3-dimensional space or that a discussion of surface curvature is far beyond the reader's ability to grasp. Too often is neither of these true. The writer attempts to present a mathematical discussion of this matter in which only the bare fundamental concepts of the differential calculus are needed.--Author's abstract.

(1203) GRAVIMETRIC RESULTS IN THE DUTCH EAST INDIES IN CONNECTION WITH MOUNTAIN FOLDING PROCESSES

By F. Vening Meinesz

Bulletin of the Geological Society of America, Washington, vol. 43, No. 1, 1932, pp. 125-126.

This paper was presented at the fourty-fourth annual meeting of the Geological Survey of America held at Tulsa, Okla., December 29, 30, and 31, 1931. The abstract of the paper given in the Bulletin of the Geological Society reads as follows:

> The maritime gravity research in the Netherlands East Indies, made possible by the Dutch Navy and executed by the Netherlands Geodetic Commission in 1929 and 1930, showed remarkable deviations of isostasy. Along a line extending through the whole archipelago, a narrow strip of strong negative anomalies was found which was bordered on both sides by fields of positive anomalies. The differences ranged between 150 and 430 milligals. This strip runs through the Indian Ocean, outside of the islands of Sumatra and Java, continues over Timor, the Tenimber Islands, Aru Islands, west of Halmaheira, over the Talaud Islands, towards the Philippine Deep. The strip generally coincides with the area where we have most earthquake centers and so everything points to the supposition that it reveals the main line of the tectonic activity in this region. It seems most likely to the writer that the strip is caused by a concentration of light surface material in the earth's crust and, as this concentration is evidently not found in the surface layers of the crust -- it shows a remarkable independence of topographic features -- we must accept a downward concentration of light masses. This leads to the hypothesis that the main crust is buckling downwards along this line while the surface layer is more or less independently folding and thrusting upwards.
>
> The strip shows a remarkable correlation with the distribution of volcanoes. Everywhere, where there is a curve, we find a parallel row of volcanoes at some distance to the inside of the curve. A possible explanation of this correlation might be found in tension developed in the crust in a direction parallel to the buckling line caused by the movement of the crust from the inside of the curved line.
>
> This hypothesis agrees well with the views of most geologists that the archipelago represents the first stage of mountain formation. We may interpret the downward folding as the formation of the root of the future mountain system. When the compressional movement continued the surface folds and overthrusts will gradually be concentrated above this root and so, in the long run, it will develop towards a folded mountain system, supported by a root of light crustal material. Isostasy will then have been reestablished in the same way as the actually existing mountain systems are in equilibrium.

2. MAGNETIC METHODS

(1204) MAGNETISCHE MESSUNGEN AM OBERHARZER DIABASZUGE

(MAGNETIC MEASUREMENTS IN THE UPPER HARZ DIABASE MOUNTAIN CHAIN)

By Martin Rössiger and Kurt Puzicha

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 3, No. 1, 1932, pp. 45-108.

This is a study on the magnetic attitude of the diabase and iron ores of he Oberharz with a special consideration of its petrographic conditions; the rticle is a contribution to the theory of the magnetic method of prospecting nd its application in this region.

Authors' abstract reads as follows:

The authors have measured the magnetic anomalies caused by diabase rocks and sedimentary hematite ores which have been partly altered into magnetite. The territory is known as the "Oberharzer Diabaszug" and is located in the NW part of the Harz Mountains. The region is composed of igneous and sedimentary rocks of Devonian age with a general thickness of 1,500 feet, and contains in certain horizons deposits of hematite ore. The eastern part of the region has come in contact with the younger granitic rocks of the Brocken intrusion.

Outside the zone of contact the most marked magnetic disturbances amounting up to 1,000 γ were produced by diabase rocks of the uppermost Devonian and lowest Carboniferous ("Kulm"). The isanomals have an elongated oblong form, and indicate the positions of higher magnetite concentrations. The hematite deposits are found at two geological horizons, the older deposits in the middle Devonian are not magnetized, but the younger ones (overlying the youngest greenstones) produce characteristic anomalies.

In the contact zone the hematite ores were subject to thermal metamorphism, forming magnetite, which causes anomalies of 12,000 γ, the highest so far observed in Germany. The observed anomalies are in good agreement with disturbances computed for theoretical plate shaped bodies. Probably a weak residual magnetism must be added to the induction of the earth's magnetic field.

In the appendix formulas used for the interpretation are developed.

(1205) ERDMAGNETISCHE UNTERSUCHUNGEN BEI SISAK

(EARTHMAGNETIC INVESTIGATIONS NEAR SISAK)

By J. B. Ostermeier

Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie,
Vienna, vol. 40, No. 17, 1932, pp. 155-159.

Earthmagnetic investigations in the vicinity of Sisak were carried out with an accuracy equal to ± 4 γ. A break of primitive rocks to the west of the Sisak meridian, traversed by faulting of a large leap, was established. In the region of the break the fault was found to be filled out with conglomerates and enlarging to a wide crack.

Indications showing the existence of a salt dome were not disclosed. An anticline to the east of Neu-Sisak may be expected.--Author's abstract translated by W. Ayvazoglou.

(1206) GEOLOGISCHE DEUTUNG DER VON JOH. B. OSTERMEIER BEI SISAK DURCHGEFÜHRTEN ERDMAGNETISCHEN UNTERSUCHUNGEN

(GEOLOGICAL INTERPRETATION OF EARTHMAGNETIC INVESTIGATIONS CARRIED OUT BY JOH. B. OSTERMEIER NEAR SISAK)

By L. Waagen

Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie,
Vienna, vol. 40, No. 18, 1932, pp. 167-168.

After the analyzation of the results of the earthmagnetic investigations carried out by Ostermeier near Sisak (see the preceding abstract), Waagen concludes that these investigations are of great value for supplementing the geological knowledge of this area at its main points. But, he adds, the correct geological interpretation of the results is possible only after the geological conditions of the surrounding region are established.--W. Ayvazoglo

(1207) MAGNETIC RESURVEY OF OKLAHOMA CITY FIELD

By O. C. Clifford, jr.

Bulletin of the American Association of Petroleum Geologists, Tulsa,
vol. 16, No. 12, 1932, pp. 1171-1176.

Comparative results of two magnetometer surveys, one in December, 1927, b fore the discovery of oil, and one in January, 1932, after production had reached maturity, show that the vertical component of the earth's magnetic field has been changed in detail by the presence of production equipment. The generalized magnetic pattern remains similar, however, for both surveys.--Author's abstract.

(1208) MAGNETIC VECTOR STUDY OF REGIONAL AND LOCAL GEOLOGIC STRUCTURE IN PRINCIPAL OIL STATES

By W. P. Jenny

Bulletin of the American Association of Petroleum Geologists, Tulsa,
vol. 16, No. 12, 1932, pp. 1177-1203.

The local magnetic vectors at the United States Coast and Geodetic Survey stations in Louisiana, Texas, Arkansas, Oklahoma, Kansas, Mississippi, Alabama, and California have been computed by deducting the normal values of the earth's magnetic field from the absolute measurements, at each station, of the declination and of the vertical and horizontal magnetic intensities.

The local magnetic vectors have been plotted as vector triangles at the respective stations on the vector maps of the different States.

These vectors indicate the intensity and the direction in space of the magnetic lines of force, as due to local magnetic anomalies mainly within the first 15,000 feet of subsurface.

As local magnetic anomalies are, with negligible exceptions, the result of geologic features, either of structural or petrographic character, a large amount of regional and local geologic information is obtained by a study of these maps.

The main magnetic anomalies of the different States have been interpreted in terms of geology, though no attempt has been made to exhaustively interpret all vectors.

The vector maps show at a glance which areas are of interest for magnetometer surveys, what size anomalies may be expected, how far a magnetometer survey has to be extended, or where it is best commenced to cover a certain area.

As the vectors are of sufficient accuracy, they allow a checking and tying-in of scattered magnetometer surveys.--Author's abstract.

(1209) A REPORT OF THE MAGNETIC SURVEY AT THE MIAO-ERH-KOU IRON MINE, SOUTH MANCHURIA

By Yoshizo Fujita

Memoirs of the College of Engineering, Kyoto Imperial University, Kyoto,
vol. 7, No. 3, 1932, pp. 159-186.

Contents: (1) Brief account of the Miao-erh-kou iron mine; (2) field procedure and characteristic features of the explored area; (3) results obtained by the magnetic survey; (4) interpretation of the results; (5) suggestion of the prospecting plan of the Miao-erh-kou iron mine for the future from the viewpoint of the magnetic survey. Seven figures and 4 plates.

The largest magnetic anomaly of the vertical intensity at Miao-erh-kou was found to be 4.45 Γ (Gauss), larger than that at Kurunavaara, Kursk, and Caribou. The reason why such a great anomaly was found remains, according to the author, uncertain and may be a subject of a further inquiry. Observations were carried out by three parties, each provided with a Thalen-Tiberg magnetometer. The area of the field of magnetic survey was about 215 acres. The number of stations where magnetic intensities were measured was 964. The average rate of each party was 42 stations per day.--W. Ayvazoglou.

(1210) RESULTS OF MAGNETIC OBSERVATIONS MADE BY THE UNITED STATES COAST AND GEODETIC SURVEY IN 1930

By Daniel L. Hazard

U. S. Department of Commerce, Coast and Geodetic Survey, Washington,
Serial 544, 1932, 33 pp.

Contents: (1) Introduction; (2) distribution of stations; (3) secular change of the magnetic declination; (4) instrumental corrections; (5) diurnal variation correction; (6) arrangement of tables; (7) magnetic observations, table of results.

The results presented in the table are arranged by States alphabetically, and the results of each State are given in the order of increasing latitudes. --W. Ayvazoglou.

(1211) SCHMIDT'S VARIOMETER MOST PRACTICAL INSTRUMENT FOR GEOPHYSICAL PROSPECTING (IN SERBIAN)

By D. V. Frost

Bulletin de l'Industrie Minière, Belgrade, January, 1931, pp. 15-16.

A brief description of the vertical and horizontal variometers is given. Their practical advantages are indicated.--V. Gorsky.

3. SEISMIC METHODS

(1212) BEITRAG ZUR THEORIE DER AUSBREITUNG SEISMISCHER WELLEN

(CONTRIBUTION TO THE THEORY OF THE PROPAGATION OF SEISMIC WAVES)

By Johannes Picht

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik,
Leipzig, vol. 3, No. 1, 1932, pp. 1-8.

With reference to the Huygen's principle and for the case of superimposed layers the elastic waves corresponding to the wave-velocity of the upper layer are discussed. It is supposed that, due to the strongly damped waves from the center (Herd) of the explosion, each particle of the boundary of the two media is oscillating, thus producing spherical waves which reach the surface. If there were no damping we could only observe, among the waves having the velocity of the upper layer, the direct and reflected ones. On the other hand it is to be expected that due to strong damping the conditions may change and consequently other impetus may be noted.

The author wishes to emphasize that the article is a theoretical essay; a final solution of the problem can be obtained only after a numerical calculation.--Author's abstract.

(1213) ZUR EXPERIMENTELLEN SEISMIK UND DEREN ANWENDUNGEN

(ON EXPERIMENTAL SEISMIC AND ITS APPLICATIONS)

By Ferdinand Müller

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 1, 1932, pp. 125-136.

The article contains a review of qualitative and quantitative observations on seismograms by which the use of time-distance curves is made unnecessary. A series of practical examples is briefly examined and some remarks, based on experimental results, are made on the way the method has to be used.--Author's abstract translated by W. Ayvazoglou.

(1214) APPLICATION OF REFLECTION SEISMOGRAPH

By Eugene McDermott

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1204-1211.

This paper describes in detail a reflection seismograph survey of western Henderson and eastern Navarro Counties, and covers the area just north of the Mexia-Powell oil field. A number of faults are located and closure is indicated on two. A cross section of the area shows the relation of the reflection records to the subsurface structure. Reflections were obtained throughout the area of the Pecan Gap and a basal member of the Austin chalk. Contour maps on these two reflection horizons are included.--Author's abstract.

(1215) USE OF RECORD CHARACTER IN INTERPRETING RESULTS AND ITS EFFECT ON DEPTH CALCULATION IN REFRACTION WORK

By T. L. Allen

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1212-1220.

In seismograph exploration, the author has encountered acoustic horizons which do not transmit seismic energy readily. The first impulse on the seismogram has a short period with small amplitude, and requires considerable energy to make it apparent at long distances. This horizon is underlain by one of slightly higher velocity which transmits the energy readily and has a distinctly different wave form. On account of the difficulty of energy transmission, the horizon which has the small "forerunner" wave might be interpreted as a lens and not a continuous horizon. By making use of the character of the wave form on the seismograms, the two horizons may be definitely identified, and the one which is a poor conductor of energy definitely proved to be a continuous acoustic horizon.--Author's abstract.

(1216) SEISMOLOGICAL DISCOVERY AND PARTIAL DETAIL OF VERMILION BAY SALT DOME, LOUISIANA

By E. E. Rosaire and O. C. Lester, jr.

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1221-1229.

The Vermilion Bay salt dome in Iberia Parish, La., was one of the first discovered by a geophysical survey of water-covered areas. The field organization and equipment of such a crew is described. The discovery and detail data are presented, along with the original interpretation of these data. The results of drilling are shown, and the agreement and disagreement of these tests with the original interpretations is discussed to some extent.--Authors' abstract.

(1217) SEISMIC WEATHERED OR AERATED SURFACE LAYER

By O. C. Lester, jr.

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1230-1234.

The existence of a comparatively thin surface layer with a low-velocity characteristic has been recognized in seismic work for several years, and has been generally referred to as the "weathered layer." This low-velocity surface characteristic has been found to be almost universally present regardless of the nature of the surface deposits, and does not conform to the geologic weathering of the area.

The purpose of the writer is to offer as an explanation of this phenomenon the mixture of air in a free state with surface materials. Theoretical calculations, if the earth is assumed to be a fluid, indicate that velocities less tha that of sound in air should be obtained from such mixtures. This is borne out by experimental data, as far as available, indicating that this so-called weathered layer might properly be termed an "aerated" layer.--Author's abstract

(1218) STRUCTURE OF THE EARTH'S CRUST AS DERIVED FROM SEISMOGRAMS

By B. Gutenberg

Bulletin of the Geological Society of America, Washington,
vol. 43, No. 1, 1932, pp. 236-237.

This paper was presented at the thirteenth annual meeting of the Cordilleran Section of the Geological Society of America, held at Pasadena, Calif., March 6 and 7, 1931.

The abstract of the paper, published in the bulletin of the society mentioned, reads as follows:

> The waves starting from the epicenter of an earthquake follow different paths through the interior of the earth. If we have a certain number of diagrams from the neighborhood of an epicenter we can calculate the velocities of the waves in the different layers, the thickness of these layers and their elastic constants. By comparing these values with those found in laboratories we can make some statements on the material of the different layers of the earth's crust. Results for different regions of the earth are given.

(1219) APPLICATIONS RÉCENTES DE LA SÉISMOLOGIE EN ITALIE

(RECENT APPLICATIONS OF SEISMOLOGY IN ITALY)

By E. Oddone

Union Géodesique et Géophysique Internationale, Toulouse,
Series A, No. 7, 1932, pp. 12-15.

The following four applications of seismology carried out in Italy are mentioned: (1) In the Valley of the Po; (2) in Rome; and two in Genoa. The author gives also his opinion on the relation between the terrestrial relief and the lengths of seismic waves. There are reasons for believing that at the epicenter of an earthquake for every thousand short shocks there is a movement of the locality as a whole, corresponding to a wave of the period of the long waves.

The author concludes that the consideration of a relation between the terrestrial relief and the lengths of seismic waves offers to seismology and geodesy a new field for the research work.--W. Ayvazoglou.

(1220) THE DAMPING OF SEISMOMETRIC INSTRUMENTS

By Frank Werner

Union Géodesique et Géophysique Internationale, Toulouse,
Series A, No. 7, 1932, pp. 43-53.

Three types of seismometers are examined: The ordinary type, the Galtizin type, and the ordinary type of seismometer with optical amplification assigned for use in the area of destruction caused by earthquakes. The results are discussed.--W. Ayvazoglou.

(1221) SUR QUELQUES PARTICULARITÉS DANS L'ENREGISTREMENT D'UN PENDULE HORIZONTAL ATTEINT PAR LES ONDES EXPLOSIVES

(CONCERNING SOME PECULIARITIES IN THE REGISTRATION OF A HORIZONTAL PENDULUM SUBJECTED TO EXPLOSIVE WAVES)

By E. Oddone

Union Géodesique et Géophysique Internationale, Toulouse,
Series A, No. 7, 1932, pp. 57-60.

Results of seismic observations near the lighthouse of Genoa, where artificial explosives were used for building a road in the mountains, are described.

The author mentions that during either artificial or volcanic explosions the particularity of eccentric half-waves has been observed many times; this was explained by attributing it to the interference phenomena. The author is of the opinion that these eccentric half-waves are closely connected with the solitary wave found theoretically by H. Lamb and described by him in his work published in 1904 in volume 303 of the Philosophical Transactions, London, under the title, "On the propagation of tremor over the surface of an elastic solid."--W. Ayvazoglou.

(1222) THE WOOD-ANDERSON SEISMOGRAPH

By James B. Macelwane

Union Géodesique et Géophysique Internationale, Toulouse,
Series A, No. 7, 1932, pp. 80-92.

Details of a torsion seismometer evolved by Anderson and Wood are explained and illustrated by plates. The requirements of a seismograph for the investigation of local earthquakes were set out as follows: (1) Maximum sensitivity for the short-period oscillations of local earthquakes; (2) a fairly high direct magnification; (3) negligible friction; (4) maximum fidelity or purity of the record; (5) such stability and lightness as would survive a severe shock and ermit recording immediately afterward; (6) a time-scale sufficiently open to ermit the study of all individual oscillations, and (7) the timing of all scillations and impulses to the nearest tenth of a second and in a manner hat would not be interrupted by an earthquake shock. The advantages of this eismograph are discussed.--W. Ayvazoglou.

(1223) EXPERIMENTS TESTING SEISMOGRAPHIC METHODS FOR DETERMINING CRUSTAL STRUCTURE

By B. Gutenberg, Harry O. Wood, and John P. Buwalda

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 22, No. 3, 1932, pp. 185-246.

In this paper the authors discuss the results of experiments executed with view to ascertaining the effectiveness of seismographic methods in the etermination of the structure of both the more superficial and the deeper arts of the earth's crust. Based on these results the authors conclude that: 1) The velocities of surface waves and of direct compressional waves through he surface parts of the crust can be measured with a high degree of precision; 2) by the reflection method, depths to boundary surfaces between rock masses r strata possessing different physical properties can be measured down to 0,000 feet and, under most favorable conditions, probably down to 20,000 feet r more; (3) by the refraction method velocities not merely in the superficial ut also in the deeper layers can be accurately determined by spacing recording nd detonation points relatively far apart. Depths to marked boundary suraces can be computed; (4) the effectiveness of the seismic methods depends ery much upon the favorableness of soil, formational, and structural conditions; (5) the methods require elaborate equipment and a highly trained ersonnel; (6) seismic methods constitute a powerful new tool for determining oth the shallower and the deeper structures of the earth's crust.--W. Ayvazoglou.

(1224) LITTLE EARTHQUAKES OF TRAFFIC RECORDED BY TINY SEISMOGRAPH

Editorial note

Science News Letter, Washington, vol. 21, No. 579, 1932, p. 305.

A brief description of a seismograph, classed as an "accelerometer" and evised by Frank Neumann, seismologist of the U. S. Coast and Geodetic Survey, or measuring short-wave vibrations, is given.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(1225) SUR UN THÉORÈME RELATIF AUX MILIEUX ÉLECTRIQUEMENT ANISOTROPES ET SES APPLICATIONS À LA PROSPECTION ÉLECTRIQUE EN COURANT CONTINU

(ON A THEOREM RELATING TO ELECTRICALLY ANISOTROPIC MEDIA AND ITS APPLICATION TO THE ELECTRICAL PROSPECTING BY DIRECT CURRENT)

By Raymond Maillet and Henri Georges Doll

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
vol. 3, No. 1, 1932, pp. 109-124.

The following abstract is given by C. and M. Schlumberger:

> In 1920 we indicated that in sedimentary formations the ions have a greater mobility parallel to the strata than perpendicular thereto and thus generally act as anisotropic conductors in electrical prospecting. Two of our collaborators, Messrs. Raymond Maillet and Henri Georges Doll, expound a theorem whereby it is often possible to deduce the determination of the electric field in an anisotropic space from that of the field in a different but isotropic space. They then apply this method to the study of the principal types of tectonic structures.

(1226) PROSPECTING AND EXPLORATION FOR SAND AND GRAVEL

By J. R. Thoenen

Department of Commerce, U. S. Bureau of Mines, Washington, D. C.,
Information Circular 6668, December, 1932, 52 pp.

In connection with the possibility of the application of geophysical metho for determining gravel deposits, which as yet have not been used by operators, Thoenen mentions that in making tests with the resistivity methods for locating the depth of bedrock the differences in resistivity marked at two stations, together with the knowledge of the local geology, indicated the presence of a sharply defined gravel deposit. In another test one station showed an abnormally high value of apparent specific resistivity indicating a shallow highly resistant body underlain by a relatively better conductor. This again was interpreted as gravel. These results were checked upon land known to contain gravel. The resistivity test coincided almost exactly with the known gravel area. For the details of these investigations the author refers to M. King Hubbert's "Results of earth resistivity survey in various geologic structures in Illinois," American Institute of Mining and Metallurgical Engineers, Technical Publication No. 463 (see Geophys. Abs. 35). Thoenen concludes that from these results it would seem that geophysical methods have a place in the field of gravel prospecting, especially in the location of deposits otherwise hidden from surface examination.--W. Ayvazoglou.

(1227) ADVANCES IN TECHNIQUE AND APPLICATION OF RESISTIVITY AND POTENTIAL-DROP-RATIO METHODS IN OIL PROSPECTING

By C. A. Heiland

Bulletin, American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1260-1336.

The successes which have been obtained with electrical methods of prospect-
g in detecting metallic orebodies have led to repeated attempts to use them
so in oil prospecting, both in structural work and in locating the oil itself.
ese attempts have not met with as much success as the application of the
ectrical methods to the location of orebodies; however, the interest in the
ssibilities of electrical prospecting as applied in oil work has been aroused
ain of late, due to the perfection of the resistivity and potential-drop-
tio method in regard to the determination of the depth to geologic bodies.

The object of the writer is to give a summary of the whole field of the
sistivity methods, with particular reference to the recent developments. The
ctors affecting the resistivity of rocks, and methods for the determination
resistivities of rocks and formations are described. Then follows a
scription of the various surface-potential methods. First, the resistivity
thods proper are discussed, with reference to electrode arrangements,
paratus, and methods of interpretation. The opinions of various authors are
scussed who have expressed their views about the possibilities of locating
l directly by electrical methods, and examples are presented of results
ich have been obtained thus far with resistivity methods, both in structural
ospecting and in attempting to locate the oil directly.--Author's abstract.

(1228) USE OF GEOELECTRIC METHODS IN SEARCH FOR OIL

By O. H. Gish

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 12, 1932, pp. 1337-1348.

Factors which have adversely influenced opinions and general impressions
garding the value of geoelectric methods as aids in the search for oil are
ought by the author to be in considerable part of subjective rather than ob-
ective origin. However, geoelectric methods entered the field relatively late
d with inadequate theoretical equipment for the best interpretation of results.
rthermore, sources of error which doubtless vitiated results have been in some
ses overlooked because these did not come into serious account in the pre-
ious experience of exploration for ores. The principal sources of error for
e resistivity method are pointed out. Although electromagnetic and resisti-
ty methods have shown distinct promise in this field, it is, in the author's
inion, not possible with the data now available to make a reliable compari-
on, in terms of potential results per dollar, between these and gravimetric
r seismic methods.--Author's abstract.

5. RADIOACTIVE METHODS

(1229) CORRELATION BETWEEN RADON AND HEAVY MINERAL CONTENT OF SOILS

By R. W. Clark and Holbrook G. Botset

Bulletin of the American Association of Petroleum Geologists, Tulsa,
vol. 16, No. 12, 1932, pp. 1349-1356.

The presence of radon in the soil can not be used as a criterion for loca ing oil fields, since the source of the radon lies in the radioactive minerals of the soil and not in the petroleum at greater depths. Formation contacts could be located by a radon survey even though obscured by top soil and vegetation, because there is quite likely to be a difference in heavy mineral character and content of two different formations. Likewise faults may be indicated if they bring two quite different formations into juxtaposition, but there is always danger of misinterpreting variations in the radon content of a soil which may be due simply to local variations in the amount of radioactive minerals in one and the same formation.--Authors' abstract.

(1230) HEATING EFFECT AND DISTRIBUTION OF RADIOACTIVE MINERALS IN THE EARTH'S CRUST

By B. Willis

American Journal of Science, New Haven, vol. 23, March, 1932, pp. 193-226.

Since 1915 several geologists and geophysicists have framed hypotheses regarding the distribution of radioactive minerals in the earth and the heat-ef attributable to them. Holmes, Joly, Chamberlin, Barrel and L. H. Adams have published more or less elaborate discussions. In this article the several hypotheses are considered from the point of view of the method of multiple hypotheses, each of them briefed and subjected to the test of the verity of it fundamental assumptions. The task is simplified by grouping the theories unde two heads, namely those that postulate some regular distribution of radioactiv minerals in the globe versus those that assume irregularity of distribution. Reasons are assigned for regarding the former as inconsistent with the facts and consequently unreal, whereas the latter group of discussions appears to contain the seed of fruitful progress toward an understanding of the thermal, eruptive history of the earth.--Author's abstract.

7. UNCLASSIFIED METHODS

(1231) NOTES ON PETROLEUM GEOPHYSICS

By William M. Barret

The Proceedings of the Louisiana Academy of Sciences, vol. 1, No. 1, August, 1932, pp. 56-57.

Essential elements of the several geophysical methods (seismic, gravimetric, lectric, and magnetic) used in connection with petroleum geology are briefly iscussed.--W. Ayvazoglou.

(1232) GEOPHYSICAL DISCOVERIES HOLD GULF COAST PRODUCTION UP

By Jack Logan

The Oil Weekly, Houston, vol. 66, No. 9, 1932, pp. 24-28.

The extent to which geophysics has been responsible for discoveries in the ulf Coast is shown in a series of accompanying tabulations. The facts preented in tabular form are as follows:

	Oil fields	Domes: No oil	Total
Nongeophysical discoveries	49	8	50
Geophysical discoveries	29	14	43
Total	71	22	93

Those tabulated facts are an impressive record for geophysics when it is onsidered that nongeophysical methods have been applied since 1901 -- that is, uring a period of 31 years -- and that geophysics yielded its first salt dome nly in 1924; eight years later 43 oil fields and domes were discovered; furthermore, this remarkable achievement was made under the handicap that the asier discoveries had already been made when geophysics entered the field. --W. Ayvazoglou.

(1233) SEMIPORTABLE ALTERNATING-CURRENT SUSCEPTIBILITY METER

By Wm. M. Barret

Physics, Menasha, vol. 3, No. 3, 1932, pp. 149-154.

This paper describes a semiportable alternating-current instrument that as been developed recently for measuring the magnetic susceptibility of eological samples. Its construction, basic theory, and operation are outined briefly.--Author's abstract.

(1234) USE OF GEOPHYSICS IN PLACER MINING

By J. J. Jakosky and C. H. Wilson

The Mining Journal, Phoenix, vol. 16, No. 14, 1932, pp. 3-5 and 29.

In this article the authors give a description of a geophysical survey conducted on a portion of the property of the Majestic Mines Co., in Trinity County, Calif. Geoelectric studies were carried out for determining thickness of gravel and fill materials, and depth of bedrock. Subsurface contour maps of the bedrock were plotted from these data. The magnetic work indicated a fairly flat but somewhat irregular bedrock surface. The work showed a well-defined concentration of gravels in the southern portion; this was substantiated by the electrical results in this locality.

No strong local concentrations of magnetic minerals were indicated; that is, the gravels were fairly uniform in composition and showed the usual concentrations near and at the bedrock.--W. Ayvazoglou.

(1235) CONTRIBUTIONS FROM GEOPHYSICS TO GEOLOGY

By J. C. Karcher and C. A. Heiland

Bulletin of the Geological Society of America, Washington,
vol. 43, No. 1, 1932, pp. 160-161.

This paper was presented at the forty-fourth annual meeting of the Geological Society of America, held at Tulsa, Okla., on December 29, 30, and 31, 1931.

The abstract of Karcher and Heiland's paper, given in the Bulletin of the Geological Society, reads as follows:

> Four geophysical methods have been extensively employed in petroleum geology in the United States. The magnetometer has surveyed a vast area. It has developed our knowledge of the character of the crystalline basement. The torsion balance has been successful in locating salt domes and determining their outlines. Electrical prospecting has not been very successful to date but promises to indicate subsurface unconformities and attitudes of beds. The seismograph has discovered many salt domes. It has discovered at least three producing fields in Oklahoma. It has outlined the area accurately, as well as the depth and thickness of buried formations.

(1236) RELATION OF GEOLOGY TO GEOPHYSICS ON THE GULF COAST

By J. Brian Eby

Bulletin of the Geological Society of America, Washington,
vol. 43, No. 1, 1932, p. 249.

This paper was presented at a joint session of Section E of the American ssociation for the Advancement of Science and members of the Geological Society f America, held at New Orleans, La., January 1 and 2, 1932. The abstract of he paper is given in the number of the bulletin mentioned. It reads as ollows:

> The finding of more than 60 salt domes on the Gulf Coast of Texas and Louisiana during the last 8 years by torsion balance and seismograph has more than doubled the potential mineral valuation of the coastal area. Prior to these discoveries there were 46 known salt dome fields in the coastal region. From 1910 to 1923, inclusive, only 10 such structures were located, indicating the hazard of drilling on inconspicuous surface indications.
>
> The torsion balance was introduced late in 1922 and the seismograph in 1923. By the end of 1931 the torsion balance has located 10 proved structures and the seismograph about 50. Many additional probable structures have been indicated.
>
> The aggregate cost of geophysical prospecting on the Gulf Coast is estimated at $30,000,000, including $26,000,000 on seismograph, $3,000,000 on torsion balance, and $1,000,000 on all other methods and experimentation. In proving and developing the 60 structures found by these means, some 300 wells have been drilled at an aggregate cost of $15,000,000. Leasing and exploration permits have cost probably $5,000,000.
>
> If drilling and lease costs are eliminated as being a common factor of expense to any method of exploration, actual geophysical expenditures have already been returned. In 1930, 18.2 per cent of all Gulf Coast dome production was from geophysically located structures. The geophysicist has an assured and important position on the coast.

8. GEOLOGY

(1237) REVIEW OF OIL-BEARING DEPOSITS IN YUGOSLAVIA (IN SERBIAN)

By L. Baskakov

Bulletin de l'Industrie Minière, Belgrade, July, 1932, pp. 201-202.

The author briefly describes oil-bearing regions in Yugoslavia, indicating he places where geophysical work has been carried on and where successful reults may be obtained by suitable methods of prospecting.--V. Gorsky.

(1238) REVIEW OF ORE DEPOSITS IN YUGOSLAVIA (IN SERBIAN)

By K. Petkovic

Bulletin de l'Industrie Minière, Belgrade, June and December, 1931, pp. 209-213 and 405-407.

Ore deposits in Yugoslavia are briefly described and the areas most interesting from the viewpoint of geophysical prospecting are indicated. --V. Gorsky.

9. NEW BOOKS

(1239) Annales Guébhard-Séverine. Edited by the Institute of Geophysics and Various Sciences, foundation Adrien Guébhard-Séverine, Neuchatel (Switzerland), 4, Rue du Seyon. The periodical is distributed free. Contents of No. 7, 1931: Psychology of scientific thought, by R. de Saussure; Some problems of alchemistic literature, by J. Ruska; Tetrahedra field of action of atoms, by R. Reinicke; Radiation of interstellar spaces and cosmic processes, by L. Zehnder; fundamental physical units (concerning the nomenclature), by A. Jaquerod.

(1240) Barret, William M. (Inc.). Mapping geological structure with the magnetometer. Giddens-Lane Building, Shreveport, La., 1932, 14 pp. The subject is presented in this pamphlet under the following divisions: (1) The purpose of petroleum geophysics; (2) the magnetic method of prospecting; (3) customary use of the magnetic method; (4) improved methods; (5) types of surveys; (6) cost of surveys; (7) practical results; (8) general.

(1241) Young, George J. Elements of mining. McGraw-Hill Book Co. (Inc.), New York and London, 3rd ed., 1932, 707 pp., 328 figs. Price, $6. Eighteen pages of Chapter II, "Prospecting," are devoted to geophysics. Various methods of geophysical prospecting (magnetic, gravimetric, seismic and electrical) are discussed and the apparatus applied is described. The use of geothermal and radioactive methods is briefly mentioned. Under the heading "Status of geophysical prospecting" the author says: "Although physical methods and instrumentation are being constantly perfected in the field of geophysics, interpretation has not kept pace to the same extent, and a good deal of information with respect to disturbing influences is needed. Nevertheless, the results of physical measurements are of great value to the mining geologist and have made contributions to the discovery of mineral deposits."

10. PATENTS

(1242) UNDERGROUND STRATA PROSPECTING

Karl Sundberg, of Houston, Texas, Assignor to Aktiebolaget Elektrisk
Malmletning, of Stockholm, Sweden, a Corporation of Sweden

nited States patent 1,843,407. Patent issued February 2, 1932.

The invention relates more particularly to oil-bearing strata; it is based n the difference which exists in the electrical conductivity of the various eds constituting the sedimentary column. The invention comprises the determina-ion of the depth to the underground strata by investigation at various points n the surface of the nature or character of an electromagnetic field.

Claims allowed - 4.

(1243) DEVICE FOR MEASURING AND RECORDING VIBRATIONS IN THREE DIRECTIONS SIMULTANEOUSLY

James Edmond Shrader, of Drexel Hill, Pennsylvania

nited States patent 1,869,828. Patent issued August 2, 1932.

Object of the present invention is to provide an apparatus which will show mplitude, frequency, wave form and phase relations in three dimensions imultaneously.

The apparatus embodying features of the invention employs the seismograph rinciple of relative motion between a heavy mass and a frame from which it is upported by a system of springs. This motion is multiplied by changing linear isplacement of the frame which moves with the vibrating body into angular dis-lacement of a beam of light, which is reflected from a mirror mounted on the oving system.

Claims allowed - 4.

(1244) METHOD AND APPARATUS FOR SURVEYING BOREHOLES

Irwin Roman, of West Orange, New Jersey, Assignor to Geophysical Research
Corporation of New York, N. Y., a corporation of New Jersey

United States patent 1,877,593. Patent issued September 13, 1932.

A method and device are provided for measuring the straightness and the egree of deviation from the vertical of a hole bored into the ground. The ethod relates to surveying boreholes by use of two magnetic compasses definite-ly spaced one above the other, recording the relative positions of the needles at one level, lowering the two compasses a distance equivalent to the distance between the two compasses, and again recording the relative position of the needles.

Claims allowed - 3.

(1245) UNDERGROUND EXPLORATION METHOD

Orley H. Truman, of Houston, Texas, Assignor to Standard Oil
Development Company, a corporation of Delaware

United States patent 1,878,029. Patent issued September 20, 1932.

This invention applies to that method of underground exploration which seeks to detect and locate underground structures by the elastic waves reflect from them, the waves being sent down from the surface by explosions. The meth relates to the improvement which comprises sending out a train of waves, receiving the waves at a plurality of spaced stations, recording the indications at each station in a form which will indicate the time interval between waves of each wave train arriving at the several stations, computing the wave velocities from the so determined time intervals and the known distances betwe the stations, and from the resulting data determining the angle of emergence o the waves reflected from the underground structure.

Claims allowed - 3.

(1246) MAGNETOMETER

The Standard Oil Development Company, New York, N. Y., assignee of
Orley H. Truman, Houston, Texas, both in the U.S.A.

Canadian patent 316,809. Patent issued November 3, 1931.

The invention refers to a magnetometer and involves the combination of a magnet system, means for suspending the same for movement without substantial friction in a plane, weights mounted on the magnet system, springs connected thereto, and means for adjusting the weights and springs to place the magnet system in operative position.

Claims allowed - 3.

(1247) OIL BEARING FORMATION LOCATING METHOD

Conrad Schlumberger, Paris, France

Canadian patent 324,701. Patent issued August 2, 1932.

The invention refers to a method of locating oil-bearing formations which consists in sending a current into the soil by means of an insulated line grounded at both ends and having source of electric energy connected between said grounds, then measuring the intensity of the current and the difference of potential between a plurality of points on the surface of the soil whose precise location with respect to the grounded ends of the line are exactly surveyed, and calculating from the above data the specific conductivity of the layers of the soil at different depths, thereby determining the areas of maximum electric conductivity corresponding to the points of maximum salinity of said oil-bearing soil.

Claims allowed - 1.

(1248) GEOLOGICAL FORMATION DETERMINING APPARATUS

Conrad Schlumberger, Paris, France

Canadian patent 324,702. Patent issued August 2, 1932.

This invention refers to an electrical process and apparatus for determining the nature of the geological formations traversed by drill holes. It consists in measuring the electrical specific resistivity of the formations encountered at different depths inside the drill hole, and in its uncased parts.

Claims allowed - 3.

(1249) IMPROVED APPARATUS FOR DETERMINING THE NATURE OF THE SUBSOIL AND FOR DETECTING THE PRESENCE OF MINERALS, METALS, OR METALLIFEROUS DEPOSITS

Arthur Broughton Edge of Australia House, Strand, London, W.C. 2

British patent 364,085. Patent issued March 23, 1931.

The invention refers to the method and apparatus for determining the nature of the subsoil which comprises means for instantaneously comparing phase and potential differences in respect to the currents flowing between any two pairs of three points in the region of exploration.

Claims allowed - 4.

(1250) IMPROVED METHOD OF AND APPARATUS FOR DETERMINING THE NATURE OF THE SUBSOIL AND FOR DETECTING THE PRESENCE OF MINERALS, METALS OR METALLIFEROUS DEPOSITS

Arthur Broughton Edge of Australia House, Strand, London W.C. 2, England

Australian patent $2353/_{31}$ Patent issued April 28, 1932.

A method of determining the nature of the subsoil is presented which comprises passing an alternating current through the earth between distant or spaced earthed electrodes, producing an exact balance in potential and phase between pairs of points in the area through which the current is passed and from a series of measurements of these potentials and phase angles along lines of traverse plotting potential and phase variation curves upon a suitable chart. The apparatus for carrying out this method comprises a bridge, or semibridge in each of the two ratio arms of which is arranged a suitable impedance, which may be a resistance, capacity, or inductance or any such combination arranged in series or in parallel or in series-parallel.

Claims allowed - 5.

(1251) PHYSIKALISCHES INSTRUMENT, INSBESONDERE MAGNETISCHE WAAGE

(PHYSICAL INSTRUMENT, IN PARTICULAR THE MAGNETIC BALANCE)

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-
Friedenau of Berlin-Friedenau

German patent 549,890. Patent issued May 3, 1932.

This invention refers to a magnetic balance in which the part assigned for visual observation as well as photographic registration is made rotatable around the optical axis of the observation telescope, thus making it possible to apply this arrangement in registering apparatus having a horizontal as well as a vertical drum axis.

Claims allowed - 3.

(1252) ERSCHÜTTERUNGSMESSER

(APPARATUS FOR MEASURING VIBRATIONS)

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-
Friedenau of Berlin-Friedenau

German patent 549,766. Patent issued April 30, 1932.

The invention refers to an apparatus for measuring vibrations which is provided with several, preferably three, vibration systems, capable of measuring single components of the vibration independently from one another.

Claims allowed - 6.

(1253) DREHWAAGE NACH EÖTVÖS

(TORSION BALANCE ACCORDING TO EÖTVÖS)

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-
Friedenau of Berlin-Friedenau

German patent 550,009. Patent issued May 10, 1931.

This invention relates to the torsion balance according to Eötvös in which the measurement of the rest position of the suspension device in various zimuths to which the balance is successively adjusted takes place by a device hich is inserted in the path of the light rays to deflect the nonoscillating ight rays. . . .

Claims allowed - 4.

(1254) TRANSPORTKASTEN FÜR MAGNETISCHE WAAGEN MIT PHOTOGRAPHISCHER REGISTRIERUNG

(TRANSPORTATION BOX FOR MAGNETIC BALANCES WITH PHOTOGRAPHIC REGISTRATION)

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-Friedenau in Berlin-Friedenau

erman patent 550,190. Patent issued May 9, 1932.

This invention relates to a transportation box in which several instruments elonging together, such as a horizontal balance, vertical balance, and photographic device, are arranged and fixed in such a way that they can be used ithout being rearranged or taken out of the box.

Claims allowed - 4.

UNITED STATES BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1255) DIE RANDWERTAUFGABE DER GEODÄSIE UND DIE BESTIMMUNG DER GEOIDUNDULATIONEN AUS SCHWEREMESSUNGEN

(THE BOUNDARY-VALUE PROBLEM OF GEODESY AND THE DETERMINATION OF GEOID UNDULATIONS FROM GRAVITY MEASUREMENTS)

By Karl Jung

Gerlands Beiträge zur Geophysik, Leipzig, vol. 37, No. 2/3,
1932, pp. 233-251

The task of computing the shape of an equipotential surface from gravity values in points of this surface is called the boundary-value problem of geodesy. This problem has a unique solution if all masses are situated inside the equipotential surface, but it has an infinite number of solutions if there are masses inside and outside the equipotential surface. Therefore all methods which pretend to give a unique solution in the latter case - for instance, Hopfner's method - are not correct, and we are not allowed to base the computation of the geoid on gravity values reduced by the method of Prey.--Author's abstract.

(1256) DIE RANDWERTAUFGABE DER GEODÄSIE

(BOUNDARY-VALUE PROBLEM OF GEODESY)

By Karl Jung

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 425-426.

The boundary-value problem of geodesy which must always be solved in a certain stage of calculations is formulated by the author as follows: "From the distribution of force at a level surface to determine the shape of this surface." This boundary problem resembles the second boundary-value problem, the potential theory, but is not equal to it; therefore the possibility of its solution must be examined separately. The author refers to his article, Die Randwertaufgabe der Geodäsie und die Bestimmung der Geoidundulationen aus Schweremessungen (see previous article). He concludes: "From the ambiguity of the boundary-value problem of geodesy it results that the determination of the shape of the geoid from gravity values reduced according to Prey's method is impossible. Therefore, there are no methods by which these gravity values may be connected with the geoid undulations; thus the results of calculations which are based on these gravity values must be inconclusive. The condensation reduction (free-air reduction) remains the best method to be applied."--W. Ayvazoglou.

(1257) THEORIE EINIGER GRAVIMETRISCHER INSTRUMENTE NACH DEM PRINZIP DER BIFILAREN AUGHÄNGUNG

(THEORY OF SOME GRAVIMETRIC INSTRUMENTS ACCORDING TO THE PRINCIPAL OF BIFILAR SUSPENSION)

By A. Berroth

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 331-370.

The article consists of three parts:

Part. 1. Theory of a firmly mounted Perrot-Schmidt's gravimeter and of a ortable instrument according to this principle. (a) General theory; (b) main onditions: (c) influence of temperature; (d) some other disturbing influences; e) choice of material; (f) numerical calculations of the instruments; (g) the lastic hysteresis; (h) summary and conclusions.

Part 2. Theory of a second portable gravimeter. The apparatus described s similar to Lejay-Holweck's apparatus. The only difference is that one is ubjected to the bending elasticity and the other is subjected to the torsion lasticity. Otherwise both instruments are constructed on the same principle.

Part 3. Theory of a bifilar torsion balance. The description of this heory is given.--W. Ayvazoglou.

(1258) EXPERIMENTELLE ERGÄNZUNGEN ZUR THEORIE DES ABROLLENDEN PENDELS

(EXPERIMENTAL SUPPLEMENTS TO THE THEORY OF THE ROLLING-OFF PENDULUM)

By G. Schmerwitz

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, p. 397

Theoretical discussions given by Gebelein on the deviations in the relation between the amplitude and the time of oscillation of a pendulum (Geophys. bs. 44, p. 654), which were already proved experimentally by Martin (Geophys. bs. 36, p. 412), are, in this article, supplemented by some experimental data n addition to those already published by Schmerwitz in the Zeitschrift für nstrumentenkunde, vol. 52, No. 1, 1932, pp. 1-14, and in the Physikalische eitschrift, vol. 33, No. 6, 1932, pp. 234-239.--W. Ayvazoglou.

(1259) EIN BEITRAG ZUM ZWEIPENDELVERFAHREN BEI RELATIVEN SCHWEREMESSUNGEN

(CONTRIBUTION TO THE TWO-PENDULUM METHOD IN RELATIVE GRAVITY MEASUREMENTS)

By H. Schmehl

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 427-438.

Previous integrations with respect to the Furtwängler expression for the momentary reduction of the times of oscillation of two pendulums oscillating synchronously on rigidly supported common base were founded upon the development of a series according to the powers of the time of observation. These formulas of reduction have a limited range of validity as far as the length of the time of observation is concerned. In this article an integration of the Furtwangler expression is carried out under very general assumptions. Angle values appearing hereby are interpreted geometrically. Some conclusions and applications are given.--Author's abstract translated by W. Ayvazoglou.

(1260) EINE VORRICHTUNG ZUR BESTIMMUNG DER GELÄNDEKORREKTION BEI MESSUNGEN MIT EÖTVÖSSCHEN DREHWAAGEN

(A DEVICE FOR DETERMINING THE TERRAIN CORRECTION IN MEASUREMENTS CARRIED OUT WITH THE EOTVÖS' TORSION BALANCES)

By W. Haubold

Zeitschrift fur Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 446-453

A device is described by which the work of the evaluation of the close range levelings made during the torsion balance measurements may be reduced about five times. The values of the approximate functions for the integrals with regard to the height and distance can be read directly. Thus it remains only to carry out the integration with respect to the angle of direction. The device consists of a lath-shaped case at the lower side of which there are key-levers; by putting the device down on the ground, the levers displaced vertically act upon a simple integration arrangement.--Author's abstract translated by W. Ayvazoglou.

2. MAGNETIC METHODS

(1261) DIE URSACHE DER MAGNETISCHEN ANOMALIE VON KURSK

(THE CAUSE OF THE KURSK MAGNETIC ANOMALY)

Editorial Note

Glückauf, Essen, vol. 68, No. 48, 1932, pp. 1110-1111

Based on his personal opinion as formed in September, 1932, Krusch presented before the meeting of the "Deutsche Geologische Gesellschaft" held on November 2, 1932, his answer to the question of the cause of the Kursk magneti anomaly.

According to the magnetic, gravimetric, and seismic investigations carrie out during 1930-31, the thickness of the overburden is approximately 200 meter The resources of deposits of itabirite with 32.6 per cent mean content of iron were found to be immense.--W. Ayvazoglou.

(1262) GEOPHYSICAL PROSPECTING ON THE RAND

Editorial Note

The South-African Mining and Engineering Journal, Johannesburg,
vol. 43, No. 2137, 1932, pp. 187-188.

The tracing of the expansion of the Rand approximately 40 miles beyond the nown western limit of the Main Reef (see Geophys. Abs. 45, p. 682), has brought ut new conditions with regard to future and more detailed prospecting operaions. In connection with this the article gives a brief description of magnetic ethods of prospecting.--W. Ayvazoglou.

(1263) INWIEWEIT VERMAG DIE ANNAHME EINES SICH GLEICHFÖRMIG DREHENDEN MAGNETISCHEN ERDKERNS DIE ERSCHEINUNGEN DER ERDMAGNETISCHEN SÄKULARVARIATION ZU ERKLÄREN?

(TO WHAT EXTENT CAN THE PHENOMENA OF THE EARTHMAGNETIC SECULAR VARIATION BE EXPLAINED BY THE ASSUMPTION OF A MAGNETIC EARTH-NUCLEUS ROTATING UNIFORMLY?)

By Adolf Schmidt

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 298-403

Satisfactory explanations of the series of observations carried out during hree centuries in London, Paris, and Rome, and more or less satisfactory exlanations of observations in Capetown, may be accepted under the assumption f the hypothesis of a suitably chosen magnet rotating inside of the earth; ut this assumption can not be applied for stations at longitudes differing ssentially from those mentioned above. This becomes clear after comparing he present time yearly change in the whole earth with the conclusions drawn rom the above-mentioned assumption. It results that that assumption must be upplemented by the further assumption of an eccentric position of the magnet aving a direction toward Europe, or by the assumption of the existence of a reater permeability of the interior of the earth on that side; both conditions eem to be inconceivable from the physical viewpoint. Notwithstanding the fact hat the hypothesis under consideration can not be applied thoroughly, a comparaively great value must be assigned to it owing to its adaptability and specially because the most important observations are well represented by it.

In conclusion, the author recommends the establishment and a permanent aintenance of a greater number of well-distributed secular stations.--Author's bstract translated by W. Ayvazoglou.

(1264) LA GÉOMÉTRIE MINIÈRE

(MINING GEOMETRY)

By D. Chahnazaroff

Journal des Géomètre Experts, Paris, No. 145, November, 1932, pp. 599-607

The importance of mining geometry and its relationship to the observations in magnetic observatories and to the geomagnetic prospecting is discussed. After an historical review, the author describes the present role of this science in mining industry. Best methods for teaching these subjects in technical schools are indicated.--Author's abstract.

3. SEISMIC METHODS

(1265) A PHOTO-CELL ATTACHMENT FOR SEISMOGRAPHS

By John P. Delaney

Earthquake Notes, Washington, vol. 3, No. 4, 1932, pp. 7-9

A device is described that would give a signal in the observatory office whenever a serious quake is recorded. It has been found possible to utilize the ordinary light beam, in conjunction with a simple galvanometer relay, without amplifiers.--W. Ayvazoglou.

(1266) TWO PROBABILITY METHODS FOR THE DETERMINATION OF EARTHQUAKE EPICENTERS

By Ernest A. Hodgson

Gerlands Beiträge zur Geophysik, Leipzig, vol. 37, No. 4, 1932, pp. 390-409

The probability method developed by L. Geiger, for determining the position of an earthquake epicenter from arrival times only, presupposes a travel-time curve to which no errors are to be ascribed for the purposes of the calculation. The method thus finds its most satisfactory application in the case o data from observing stations at a fair distance from the epicenter. The prese paper deals with two modifications of the Geiger method. Both restrict the da to those furnished by stations of epicentral distance within that range for which the arrival-time curve of the longitudinal wave may be considered rectilinear. The first bases the location partly on arrival times, partly on microseismic data. The second is based wholly on the microseismic observation Each yields a value for the velocity of the longitudinal wave in the subcontinental layer. Neither can be used to determine the time at the origin. The illustrations given are from the writer's investigations of the records of the Tango earthquake, Japan, March 7, 1927. The paper is not, however, intended a a discussion of all the factors involved in the determination of that epicente --Author's abstract.

(1267) REPORT ON THE ACTIVITY OF THE EARTHQUAKE RESEARCH INSTITUTE, TOKYO IMPERIAL UNIVERSITY, DURING THE YEAR OF 1931

By Chuji Tsuboi

Gerlands Beitrage zur Geophysik, Leipzig, vol. 37, No. 4, 1932, pp. 418-428

This is the fifth report given by Tsuboi on the results of investigations made by the Earthquake Research Institute during 1931. For previous reports see Geophysical Abstracts 10, 16, 24, and 37.

Investigations on the Idu earthquake of 1930. Most of the investigations on the Idu earthquake of 1930 have recently been completed and some of the results obtained are briefly described.

Geophysical investigations. (1) Ishimoto compared the periods of earthquake accelerations in Hongō and in Marunouchi by studying the accelerograms obtained in these localities by the acceleration seismographs of his own design. Conclusions were drawn. (2) Terada studied the relation between the radium of curvature of the main island arcs on the earth and the latitude of the middle point of the respective arcs, discussed luminous phenomena accompanying earthquakes, and extended the study of the change of area included in the rhombic base lines at Mitaka, previously discussed by Tsuboi. (3) Miyabe made a detailed study on the vertical displacements of the third-order triangulation points in Bōso Peninsula that were caused by the Kwantō earthquake of 1923. (4) Tsuboi proposed a method for finding the permanent dislocation of a point on the earth's crust by an earthquake, if any, from its seismogram obtained at that station.

Mathematical investigation. Sezawa treated mathematically the transmission of earthquake waves along the bottom surface of an ocean as a 2-dimensional problem. He also solved the problem of equilibrium state, both 2-dimensionally and 3-dimensionally, around a circular or spherical cavity in which a pressure is exerted toward the outside, and in the neighborhood of which the plastic state is reached. In collaboration with Nishimura he discussed mathematically the movement of the ground due to atmospheric disturbance in an oceanic region which is often cited as one of the causes for the occurrence of microseisms. Nishimura solved mathematically the deformation of a singly stratified elastic body due to surface loading.--W. Ayvazoglou.

(1268) DISPERSION AND ABSORPTION OF THE DILATATIONAL AND DISTORTIONAL WAVES IN A VISCO-ELASTIC SOLID

By H. Arakawa

The Geophysical Magazine, Tokyo, vol. 4, Nos. 3 and 4, 1931, pp. 215-223 and 285-297

The author gives a mathematical discussion on the dispersion and absorption of waves in visco-elastic bodies under the following items: (1) General equation of motion; (2) purely dilatational waves; (3) purely distortional waves; (4) th damping factor of the oscillation; (5) longer waves are more attainable at greater distance and long waves predominate generally in larger earthquakes; (6) dispersion; (7) Rayleigh waves; (8) Love waves.--W. Ayvazoglou.

(1269) SHALLOW AND DEEP EARTHQUAKES

By K. Wadati

The Geophysical Magazine, Tokyo, vol. 4, No. 4, 1931, pp. 231-285

In the first part of this article the author gives a list of 136 violent earthquakes (from January, 1928, to June, 1931) observed Japan.

In the second part the maximum amplitude of seismic waves is treated in respective earthquakes of different depths.

In the third part the propagation of longitudinal seismic waves is investigated.--W. Ayvazoglou.

(1270) REFLECTION AND REFRACTION OF SEISMIC WAVES IN A STRATIFIED BODY

By K. Sezawa and K. Kanai

Bulletin of the Earthquake Research Institute, Tokyo, vol. 10,
No. 4, 1932, pp. 805-816

The authors give a mathematical discussion on the results of reflections and refractions of inclined seismic waves from a boundary plane for the case of one stratified layer.

The results are summed up as follows:

1. If the waves are very long in comparison with the thickness of the layer, the motion of a point on the surface is approximately similar to that of these primary waves. The apparent angle of incidence on the surface is somewhat different from the angle of incidence of primary waves.

2. If the length of the waves is small in comparison with the thickness of the surface layer, the apparent angle of incidence becomes small.

3. The ratio of length of the minor axis to that of the major axis is relatively great for small wave lengths. For very large wave lengths the length of the minor axis is approximately zero. --W. Ayvazoglou.

(1271) PRESENCE OF SLOW WAVES IN THE PRELIMINARY PHASE OF SEISMOGRAMS

By G. Agamennone

Royal Accademia Nazionale dei Lincei, Rome, vol. 15,
June 19, 1932, pp. 960-965

The author discusses the appearance at the beginning of the seismograms of ome earthquakes of certain slow waves whose presence is liable to be masked by he rapid longitudinal waves. Somville and Landsberg have recently noticed hese in the records of various earthquakes as if observed for the first time, ut the author points out that he gave an account of his observations of such aves in the seismograms of the Calabrian earthquakes of 1905 and 1908. The bserved period of these waves varies in different cases; some recorded having period of 18 seconds and others of 24 seconds.

The variation may be chiefly due to the difference in the measuring intruments. The nature of these waves is still obscure, and it is suggested that heir thorough discussion would throw light on the mechanism of propagation of arthquakes.--Abstract by J. J. S., reprinted from Science Abstracts, vol. 35, o. 419, 1932, p. 1033.

(1272) LUFTELEKTRISCHE UND ERDMAGNETISCHE BEGLEITERSCHEINUNGEN VON ERDBEBEN

(ACCOMPANYING EARTHQUAKES AIR-ELECTRIC AND EARTH-MAGNETIC PHENOMENA)

By Hans Robert Scultetus

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 370-376

Certain luminous phenomena have been observed in all parts of the globe uring many earthquakes; besides, earthmagnetic disturbances, as well as pecial forms of lightning often occurred during strong seismic activity. This hows that extraordinary changes were produced in the conditions of the lectricity of the air and the magnetism of the earth. In order to find an xplanation for these relationships and to promote cosmic synopsis the author roposes that a German Ursigram should be established (Ursi = Union Radio cientific International).--Author's abstract translated by W. Ayvazoglou.

(1273) BRECHUNGSGESETZ ODER SENKRECHTER STRAHL? EINE KRITISCHE STUDIE AUF GRUND SEISMISCHER ARBEITEN IN VENEZUELA

(LAW OF REFRACTION OR A VERTICAL RAY? A CRITICAL STUDY BASED ON SEISMIC WORK CARRIED OUT IN VENEZUELA)

By Oswald v. Schmidt

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 376-396

This article deals with the disputed problem of whether Fermat's principle r the "vertical ray" rules in the applied seismic. Based on the results of a geophysical expedition to Venezuela all the data obtained are against the "vertical ray" and in favor of the law of refraction. According to the travel-time curves, a disintegration layer situated at a depth of 1 to 10 meters differs strongly from the other layers: V_0 = 300 to 600 meters; this explains the "extremely large angles of emergence" mentioned so often. Besides, in favor of Fermat's principle speaks the fact that the t's curves are represented at the boundary of the second layer by hyperbolas. A theoretical proof showing that the maximum transmission of the energy results according to the law of refraction is given. In addition to the other experimental details an improved method is discussed by which the explosion can be made according to the sound-time. Two lines of explosion carried out in Venezuela from which all the data concerning the second and third layer were calculated according to the law of refraction are represented; the agreement between the angles of inclination was close to 0° 3'.--Author's abstract translated by W. Ayvazoglou.

(1274) LAUFZEITKURVE UND AUSBREITUNG DER ELASTISCHEN RAUMWELLEN IM ERDINNERN

(TIME-TRAVEL CURVE AND THE PROPAGATION OF THE ELASTIC VOLUMETRIC WAVES INSIDE OF THE EARTH)

By H. Witte

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 453-459

The results of the calculations of the velocity of propagation of volumetric waves in connection with the depth are discussed; the calculations are based on the travel times for the normal P and S waves, published by H. Jeffreys in January, 1932; the calculations being carried out according to the Herglotz-Wiechert method. The curves are running smoothly; surfaces of discontinuity may be expected only at the depths between 900 to 1,000 kilometers and between 2,600 to 2,700 kilometers. Besides, values calculated from the ratio of velocity of the waves are given for the Poisson's constant σ down to the depth equal to 2,700 kilometers.--Author's abstract translated by W. Ayvazoglou.

(1275) BEOBACHTUNG VON SPRENGUNGEN IN DREI KOMPONENTEN

(OBSERVATION OF EXPLOSION WITH REGARD TO THREE COMPENENTS)

By H. K. Müller

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 459-460

Results of testing the seismographs and of observations with regard to the three components are briefly mentioned.

A detailed discussion of these preliminary determinations will be published in a short time.--W. Ayvazoglou.

(1276) DIE RESONANZMETHODE ALS HILFSMITTEL BEI SEISMISCHEN UNTERSUCHUNGEN

(THE RESONANCE-METHOD AS AN AID IN SEISMIC INVESTIGATIONS)

By R. Köhler

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 461-467

Weakly damped natural oscillations of the overburden in Göttingen were measured by means of the resonance method. The weak damping resulted in the fact that the periods recorded in the Göttingen close range earthquake seismograms represented mainly these natural oscillations.--Author's abstract translated by W. Ayvazoglou.

(1277) ZUSAMMENHANG ZWISCHEN BODEN-UND GEBÄUDESCHWINGUNGEN

(RELATIONSHIP BETWEEN THE OSCILLATIONS OF THE GROUND AND OF THE BUILDINGS)

By A. Ramspeck

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 467-469

The influence of only the horizontal oscillations on a building is discussed in this article. A numerical example is given.--W. Ayvazoglou.

(1278) NEUBEARBEITUNG DER SCHALLBEOBACHTUNGEN, INSBESONDERE DES GEOPHYSIKALISCHEN INSTITUTES IN GÖTTINGEN

(NEW TREATMENT OF SOUND OBSERVATIONS, ESPECIALLY OF THOSE MADE BY THE GEOPHYSICAL INSTITUTE OF GÖTTINGEN)

By H. Regula

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, p. 469

The following items are discussed:

1. Four explosions produced on May 27, 1927, and observed at four stations.

2. The author's investigations on the form of the anomalous sound zone as a function of the season.

3. The arrangements made for carrying on sound experiments in Novaya Zemlya.--W. Ayvazoglou.

(1279) BEITRAG ZUR THEORIE DES BLATTFEDERSEISMOGRAPHEN

(CONTRIBUTION TO THE THEORY OF THE LEAF-SPRING SEISMOGRAPH)

By M. Rössiger

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 470-477

The mass of a leaf-spring seismograph is shown to have two natural oscillations; their periods and centers of rotation are specified. The period of more rapid oscillation must be made smaller if a quick ground displacement is to be recorded by the mass without retardation and without reduction. Measures by which the period of this natural oscillation may be reduced are discussed. The magnifications attainable in seismographs of various construction are stated.--Author's abstract translated by W. Ayvazoglou.

4. ELECTRICAL METHODS

(1280) LOCATION OF CONCEALED WHIN DYKE BY GEOPHYSICAL SURVEYING

Editorial Note

The Iron and Coal Trade Review, London, vol. 125, No. 3381, 1932, p. 922

This paper was presented before a meeting of the North of England Institut of Mining and Mechanical Engineers. The value of geophysical prospecting in various fields of engineering was pointed out.

Two main methods of using the 4-electrode system are described: (1) Cente of electrode system fixed, electrode spacing varied, and (2) center of electrod system moved, electrode spacing fixed. The paper discusses the application of the resistivity method, according to both systems, to the tracing of the Coley Hill Dyke.

The results were examined and compared with information obtained from three colliery workings. An excellent agreement of data was established.--W. Ayvazoglou.

(1281) EINE ELEKTROMAGNETISCHE MESSUNGSMETHODE MIT ELEKTRODENVERLEGUNG ZUR AUFSUCHUNG VON LEITFÄHIGKEITSUNTERSCHIEDEN IM UNTERGRUND

(AN ELECTROMAGNETIC METHOD OF MEASUREMENT BY SHIFTING THE ELECTRODES, FOR DETECTING DIFFERENCES IN CONDUCTIVITY UNDERGROUND)

By H. Haalck and A. Ebert

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 409-419

An electromagnetic method of measurement for detecting differences in conductivity in the ground, to be especially applied in cases when the layers of ifferent conductivities are more or less horizontal, is discussed. By successive and uniform shifting, toward both sides, of the two electrodes by hich the energy is conducted into the ground we obtain, measuring the inclinaion of the magnetic vector by means of the well-known induction coil, the earth-current field as a function of the remaining essentially constant field of the line, whereby the current force is eliminated automatically.

From the form of the curve obtained graphically by plotting the inclination of the coil as a function of the distance between the electrodes, a conclusion can be drawn whether, and at what depth approximately, there is a layer having a higher or smaller conductivity.

Practical tests were made above iron ore deposits, above an iron-ore shaft, in the lignite region of the lower Rhine and above layers of shell limestone. The sensitiveness of the method of measurement could be well adapted to the objects of investigation.--Authors' abstract translated by W. Ayvazoglou.

(1282) DIE EXPERIMENTELLE BESTIMMUNG DER REAKTIONSGESCHWINDIGKEIT AKTIVER ELEKTRISCHER VORGÄNGE IM ERDBODEN

EXPERIMENTAL DETERMINATION OF THE VELOCITY OF THE REACTION OF THE ACTIVE ELECTRICAL PROCESSES IN THE GROUND)

By Max Müller

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 423-425

Owing to the fact that the conductivity of rocks depends also on the content of water in them, chemical composition of the water and on the porosity and structure of the rocks, it is only in a few cases possible to draw conclusions on the structure of the rocks by determining the electrical conductivity of these media.

The author describes in this article a new method of measurement by which this disadvantage can be eliminated.--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1283) PROBLEME DER ULTRASTRAHLUNG

(PROBLEMS OF COSMIC RADIATION)

By G. Hoffmann

Physikalische Zeitschrift, Leipzig, vol. 33, No. 17, 1932, pp. 633-662

Contents: (1) Methods of measurements; (2) results of measurements; (3) theoretical discussion; (4) general remarks.

The author gives a summary of the present knowledge of cosmic radiation. Apparatus for measuring the ionization is described.

A list of 307 articles dealing with cosmic radiation and arranged according to the years of their publication, since 1924, is added.--W. Ayvazoglou.

(1284) GANZJÄHRIGE REGISTRIERBEOBACHTUNGEN DER KOSMISCHEN ULTRASTRAHLUNG AUF DEM HOHEN SONNBLICK (3106 M.)

(FULL YEAR REGISTRATION OBSERVATIONS OF COSMIC RADIATION ON THE "HOHER SONNBLICK" (3106 M.))

By Josef A. Priebsch and Rudolf Steinmaurer
Gerlands Beiträge zur Geophysik, Leipzig, vol. 37, No. 2/3, 1932, pp. 296-314

This paper deals with observations carried out during 12 months (October, 1929, to November, 1930) on the summit of the "Hoher Sonnblick" (3106 m.) for the purpose of further study of the intensity fluctuations of the cosmic ultra-rays. Two apparatus of the Kolhörster "loop" electrometer type were used successively with a photographic self-recording device of Hess and Mathias; the instruments were screened by iron plates 7 centimeters thick, either all aroung ("Vollpanzer") or only from the sides and from beneath, but unshielded from above ("Halbpanzer"). The results of observations are discussed and given in diagrams. A relation between ionization and cloudiness, wind direction and atmospheric precipitation was not established.--W. Ayvazoglou.

(1285) THE AITKEN POCKET NUCLEI-COUNTER

By G. R. Wait

Gerlands Beiträge für Geophysik, Leipzig, vol. 37, No. 4, 1932, pp. 429-439

The possibility of misinterpreting Aitken's instructions for calculating the number of nuclei in the outside air from data obtained with his instrument, together with the fact that no adequate instructions exist for determining Aitken nuclei-counter constants from instrumental measurements, has led the author to present these instructions.

Data have been obtained in an experiment designed to furnish information as to whether or not some of the water drops formed around nuclei in the pump chamber may evaporate, leaving some nuclei free to return to the receiver on the upstroke of the piston, to account for the deposition on the subsequent rarefactions. It has also been possible to determine, from the results of this experiment, whether the same per cent of nuclei falls inside the pump chamber as inside the receiver. The results show that the nuclei falling on expansions subsequent to the first are not due to their being returned, after evaporation inside the pump chamber. These results also show that while the same per cent of nuclei does not fall inside the pump-chamber as inside the receiver, yet nly a small error will be introduced by making such an assumption. One is now ble to say, as a result of experiment, that in making a nuclei-count with an itken pocket nuclei-counter, those falling on the subsequent as well as first arefaction should be counted. One is justified also in saying, in view of the experimental results, that the instrumental constant obtained in accordance ith the equation derived will not be in error by more than a few per cent.--uthor's abstract.

(1286) AN ERROR IN THE MARKING OF AN AITKEN "POCKET DUST-COUNTER"

By V. F. Hess and C. O'Brolchain

Gerlands Beiträge zur Geophysik, Leipzig, vol. 37, No. 4, 1932, pp. 386-389

An error in the dilution marks of an Aitken "pocket dust-counter" is discussed. The errors in the higher dilutions (i.e., 1/20, 1/50, 1/100) are considerable. The correct method of marking is given.--Authors' abstract.

(1287) IONIZATION OF AIR BY γ-RAYS AS A FUNCTION OF PRESSURE AND COLLECTING FIELD

By I. S. Bowen

Physical Review, Minneapolis, vol. 41, No. 1, 1932, pp. 24-31

The ionization of air by γ-rays was studied for pressures from 1 to 93 atmospheres and for collecting fields from 1.55 to 1,009 volts per cm. Increases in ionization current of over 40 per cent were observed when the potential gradient was varied over this range, thus indicating that the lack of proportionality of ionization current with pressure obtained by previous observers was principally due to lack of saturation.--Author's abstract.

(1288) THE RADIUM CONTENT OF SOME HUNGARIAN ROCKS

By S. S. DeFinaly

American Journal of Science, New Haven, vol. 24, No. 142, 1932, pp. 306-310

A series of different Hungarian rocks was both chemically analyzed and examined for radium content. The solution method of Bamberger and Mache was used and was found to give reproducible figures. The results can be summarized as follows:

1. Granites contained 1.43 to 3.69 $\times 10^{-12}$ grams of the element Ra per gram of rock, averaging 2.50 $\times 10^{-12}$ gram/gram.

2. Andesites contained 1.64 to 2.38 $\times 10^{-12}$ grams Ra per gram of rock, averaging 1.96 $\times 10^{-12}$ gram/gram.

3. Basalts contained 1.48 to 1.93 $\times 10^{-12}$ grams Ra per gram of rock, averaging 1.70 $\times 10^{-12}$ gram/gram.

Further investigations in this field are now under way.--Author's abstract.

6. GEOTHERMAL METHODS

(1289) THE EFFECT OF TEMPERATURE ON THE DEFORMATION OF INFINITE OR SEMI-INFINITE ELASTIC BODY

By H. Arakawa

The Geophysical Magazine, Tokyo, vol. 4, No. 4, 1931, pp. 297-307

A mathematical discussion of the deformation of a semi-infinite elastic solid due to the distribution of temperature is given. This problem was treated by Nishimura for the case of a nonvariable temperature (Bull. Earthquake Research Inst., vol. 8, part 2, 1930; see Geophys. Abs. 17). In the present article Arakawa discusses the problem for variable temperature. The results are summed up by the author as follows:

1. The magnitude of the displacement and stress at a given point in the solid increases with the increase at that point of the absolute value and of the gradient of the temperature.

2. The magnitude of the displacement and stress at a given point is proportional to the coefficient of cubical expansion.

3. The magnitude of the displacement and stress at a given point diminishes with the decrease of the specific density and spectific heat and the increase of the conductivity at that point.--W. Ayvazoglou.

(1290) ON THE FLOW OF HEAT FROM A ROCK STRATUM IN WHICH HEAT IS BEING GENERATED

By C. E. Van Orstrand

Journal of Washington Academy of Sciences, Washington, vol. 22, No. 20/21, 1932, pp. 529-539

The author presents a mathematical discussion of theoretical depth-temperature curves obtained on the basis of the generation of heat in a single stratum, for sources of heat at depths of 300 meters and 1,500 meters.-- W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1291) LOS TRABAJOS EN EL LABORATORIO GEOFISICO

(WORK CARRIED OUT IN A GEOPHYSICAL LABORATORY)

By E. Pla

Petróleos y Minas, Buenos Aires, vol. 12, No. 140, 1932, pp. 6-8

This is a brief review of D. Chahnazaroff's book, "Les travaux de laboratoire géophysique," published in French (see Geophys. Abs. 45).--W. Ayvazoglou.

(1292) GEOPHYSICAL INVESTIGATIONS AT THE MAMMOTH CAVE, KENTUCKY, AND AT THE FALCONBRIDGE MINE, ONTARIO, UNDER THE JOINT AUSPICES OF THE GEOLOGICAL SURVEY, CANADA, AND THE UNITED STATES BUREAU OF MINES

By A. S. Eve and D. A. Keys

Canada Department of Mines, Geological Survey, Ottawa, Memoir 170, 1932, pp. 1-64

The article is divided into three chapters. A summary of each chapter is given by the authors separately.

Chapter I. On the absorption of electromagnetic waves by rock, pp. 1-17. Summary: (1) A method has been devised using coil, with resonated circuit, copper oxide rectifier, and direct-current galvanometer, of measuring underground, at a depth of 152 feet, the electromagnetic effects of an alternating current in a large, circular loop laid horizontally on the earth's surface.

(2) In the case of currents of 500-cycle frequency the measured absorption, due to the conductivity of the rocks 124 feet thick, was 5 per cent, so that the thickness to reduce the effects to half value, by absorption alone, would be 1,670 feet or 510 meters.

(3) The resistivities of the sandstone and limestone have been measured in situ and found to be between 100,000 and 200,000 ohm-centimeter.

(4) A theoretical value of the absorption for 124 feet of rock, with 500 cycles and 100,000 ohm-centimeter resistivity, can be calculated from Maxwell's equation for a horizontal plane wave moving vertically into the earth, and it equals 4.1 per cent, showing reasonable agreement.

(5) Preliminary measurements have also been made with currents of 21 kilocycles in the loop. With further experiments in the laboratory on copper oxide rectifiers and with further improvements in the regulation of frequency of the

current in the loop, it appears probable that measurements can be made of the laws of absorption of currents from 500 to 100,000 cycles a second.

(6) Experiments were also made on the joint use of resonated circuits and amplifiers.

Chapter II. On the use of vertical and horizontal magnetic variometers in the location of minerals, pp. 18-41. Summary: (1) The method of using the Askania vertical variometer for surveying a region to locate magnetic dykes and pyrrhotite bodies is described.

(2) The determination of the strike and extent of magnetic dykes and pyrrhotite bodies with the Askania vertical variometer is described.

(3) The use of the vertical and of the horizontal Askania variometers in the determination of (a) the dip of a magnetic body, (b) the amount of overburden, and (c) the approximate thickness of such bodies is illustrated from experiments performed in the field.

(4) An account is given of the location and tracing of a buried diabase dyke, hitherto unknown to exist, for more than a mile. Its dip, strike, and the approximate amount of overburden were found by magnetometric readings.

(5) Small-scale laboratory experiments showing the relation between the dip of a small magnet and the readings obtained on both the horizontal and vertical variometers are described, and the results are compared with the theoretical curves which are also calculated.

Chapter III. On the application of some electromagnetic induction methods of locating conducting orebodies, pp. 42-52. Summary: (1) Experiments are described illustrating the successful use of a vertical loop and small detecting coil in the location of pyrrhotite deposits, when an alternating current of 500 cycles is used to energize the loop.

(2) Using a small, tuned receiving coil, 20 inches in diameter, 841 turns of wire, a pyrrhotite body was easily detected and located more than 1,200 feet from a loop consisting of 8 turns 12 by 18 feet which was excited with 7 to 8 amperes.

(3) The use of a horizontal loop, excited with alternating current and the detection of the disturbing influence of a pyrrhotite body on the resulting electromagnetic field, detected with a tuned exploring coil, is described. The "dip" and "strike" methods of making observations are compared, the dip method giving the most satisfactory results in the experiments described.

(4) The application of the vertical-loop, electromagnetic method to the problem of distinguishing a magnetic diabase dyke from a pyrrhotite deposit is described. The diabase dyke gives no response to the 500-cycle radiation, the pyrrhotite body on the other hand being readily detected.

The following three appendices are added to the article (pp. 53-64):

(1) Theoretical variations in the horizontal and vertical magnetic fields ong a plane above an ideal bar magnet.

(2) The determination of the depth and approximate thickness of a magnetic dy from magnetometer readings made from the surface.

(3) Magnetic surveys with the Askania vertical variometer over the north-st section of the Falconbridge orebody.

(1293) DAS ALLGEMEINGERÄUSCH IN DER ATMOSPHÄRE

(GENERAL NOISE IN THE ATMOSPHERE)

By A. Nippoldt

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 403-409

The author indicates the existence of a new meteorologic-acoustical ele-nt: The general noise; a simple method for measuring its strength and a few rst results are discussed.--Author's abstract translated by W. Ayvazoglou.

(1294) GEOPHYSIKALISCHE FORSCHUNGEN DER BEIDEN LETZTEN JAHRE IN DEN POLARGEBIETEN

(GEOPHYSICAL INVESTIGATIONS CARRIED OUT DURING THE LAST TWO YEARS IN THE POLAR REGIONS)

By Kurt Wegener

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 419-423

The author briefly describes geophysical investigations carried out by the llowing expeditions:

1. Cruise of the "Nautilus": Oceanographic observations at 9 stations, gravity measurements, about 300 soundings of the depth, and one magnetic servation were made.

2. Polar cruise of the "Graf Zeppelin" in July, 1931: Meteorological ements were registered, and the usefulness of the ascents with radio-measuring vices in the polar region was tested.

3. Alfred Wegener's German Greenland expedition: Meteorological results, odesy, and glacialogy are discussed.--W. Ayvazoglou.

(1295) EINFLUSS DER SCHNEIDENLAGERUNG AUF DIE MESSGENAUIGKEIT GEOPHYSIKALISCHER INSTRUMENTE

(INFLUENCE OF THE KNIFE-EDGE BEARING ON THE ACCURACY OF MEASUREMENT OF GEOPHYSICAL INSTRUMENTS)

By G. Schmerwitz

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 8, 1932, pp. 439-445

In applying the results of the experimental investigations of knife edges to the minimum pendulum it is shown that owing to the change of the curvatures caused by the wearing off of the knife-edge the uniformity expected from this form does not exist. The author examines the application of a knife-edge bearing for a magnetic variometer and calculates the dependence of its sensitiveness from the form of the knife-edge.--Author's abstract translated by W. Ayvazoglou.

(1296) GEOPHYSICAL INVESTIGATIONS MADE IN 1930

By L. Gilchrist

Canada Department of Mines, Geological Survey, Ottawa, Memoir 170, 1932, pp. 65-99

The report comprises the results of electrical and magnetic laboratory measurements on specimens of ore and surrounding materials, a description of electrical investigations made in the field, and the results obtained from the investigations together with the conclusions that appear to be warranted by the results.

The measurements on the specimens were made in the Physics Laboratory, University of Toronto, and at the place where the field work was carried out.

The investigations in the field were made at places of the following deposits:

Deposit of chromite on the property of the Vanadium Co. of New York, in the neighborhood of Caribou Lake, Quebec.
Deposit of pyrite on the property of the Graselli Chemical Co., of Cleveland, at Clyde Lake, Renfrew County, Ontario.
Deposit of pyrrhotite at the Falconbridge mine, Sudbury district, Ontario.
Deposit of lignite at Blacksmith Rapids, Abitibi River, Ontario.--

W. Ayvazoglou.

(1297) GRAVITATIONAL AND MAGNETOMETRIC INVESTIGATIONS

By A. H. Miller

Canada Department of Mines, Geological Survey, Ottawa, Memoir 170, 1932, pp. 99-118

This report contains an account of surveys made with the torsion balance and the magnetometer during the season of 1930.

Surveys with the magnetometer were made in the vicinity of Thetford, Quebec, in the serpentine belt, also of a pyrite deposit near Calabogie, Ontario, and of a fault near Hazeldean, Ontario. Surveys with the torsion balance were made of the pyrite deposit mentioned and of the Hazeldean fault.

The results of the surveys are described and illustrated by 13 figures.--W. Ayvazoglou.

9. NEW BOOKS

(1298) Bridgman, P. W. The Physics of high pressure. Macmillan Co., 1931, New York. 398 pp., 87 figs., 25 tables. Price, $5.50. The text gives an historical sketch of the use of high pressure and the general advancement of its technique during the last 150 years. The bibliography is most complete.

(1299) David, Sir T. W. Edgeworth. A new geological map of the Commonwealth of Australia with explanatory notes, 1932. This large map, in colors, over 6 feet wide and 5 feet high, in four sheets, on the scale 1 : 2,990,000, was drawn and printed at the Department of Lands, Sydney, New South Wales, for the Commonwealth Council and Scientific Industrial Research. The map includes Tasmania and the Mandated Territory of New Guinea. Explanatory notes cover 177 pages. The map is compiled from the maps of the various geological surveys of the Commonwealth and is issued by Edward Arnold and Co., London.

(1300) Meisser, O., Martin, H., and Gengler, Th. Beobachtungsverfahren und Apparaturen für sehr genaue relative Schwere und Zeitmessungen (Method of observation and apparatus for very accurate relative gravity and time measurements). Akademische Verlagsgesellschaft m.b.H. in Leipzig, 1931. 177 pp., 110 figs. Price, R.M. 8.80. Contents: Pendulum and period of oscillation; method of observation; photographic coincidence method and pendulum as time-meter; free pendulum as a time-standard of highest precision.

10. PATENTS

(1301) ELECTRICAL GEOLOGICAL DISTURBANCE DETECTOR

Cullen R. Rogers, of Graham, Texas

United States patent 1,872,504 Patent issued August 16, 1932.

The present invention relates to a vibration detector whereby geophysical disturbances may be converted into a corresponding fluctuating current of electricity, which in turn may energize a suitable indicating or recording device.

Claims allowed - 5.

(1302) METHOD OF MAPPING SUBSURFACE STRUCTURES

Karl Sundberg, of Houston, Texas, Assignor to Aktiebolaget Elektrisk
Malmletning, of Stockholm, Sweden, a Corporation of Sweden

United States patent 1,884,364 Patent issued October 25, 1932.

This invention relates to the potential method of electrical prospecting and has for its object the provision of an improved form of this method for mapping subsurface structures.

Claims allowed - 6.

(1303) METHOD OF DETERMINING ANGLE AND DIRECTION OF DIP OF GEOLOGICAL FORMATIONS

Charles R. Nichols, of Dallas, Texas, assignor to Sperry-Sun
Well Surveying Company, of Philadelphia, Pennsylvania, a
Corporation of Delaware

United States patent 1,891,628 Patent issued December 20, 1932.

This invention relates to a method of ascertaining the dip of a bedding plane intersected by a borehole which includes taking adjacent the plane a plurality of cores whose axes extent in different directions and bear a determinable relationship with each other during the taking of the cores. The cores are taken by straight-line movements of angularly related cutters in the directions of the axis.

Claims allowed - 12.

(1304) IMPROVEMENTS IN APPARATUS FOR THE MEASUREMENT OF GRAVITATIONAL FORCE

Hubert Wenger Sykes, Starley Road, Coventry, Warwickshire

British patent 370,165 Patent issued April 7, 1932.

The present invention relates to an instrument for indicating and recording variations in the force of terrestrial gravitation, and has for its object to provide an extremely sensitive instrument by the use of which variations may be accurately observed and recorded.

According to this invention the instrument comprises a flexibly supported load having operatively interconnected therewith means for indicating and recording variation in the vertical position of the load.

Claims allowed - 6.

(1305) VERFAHREN ZUR BESTIMMUNG DES FALLSINNES VON SEDIMENTSCHICHTEN

(METHOD FOR DETERMINING THE SENSE OF THE DIP OF SEDIMENTARY LAYERS)

Société de Prospection Électrique Procédés Schlumberger in Paris

German patent 552,090 Patent issued June 9, 1932.

The invention refers to the method for determining the sense of the dip of sedimentary layers in which the electrodes connected by a rectilinear line and fed by alternating current are arranged in such a way that their interconnecting lines are directed along the deposit. The inclination of the magnetic alternating field of the ground currents is determined by means of an induction coil at the correct prolongation of the line connecting the electrodes.

Claims allowed - 1.

(1306) EÖTVÖSSCHE DREHWAAGE

(EÖTVÖS' TORSION BALANCE)

Askania-Werke A.-G. vorm. Centralwerkstatt Dessau und
Carl-Bamberg-Friedenau in Berlin-Friedenau

German patent 555,623 Patent issued July 28, 1932.

This invention refers to the torsion balance according to Eötvös, especially to that with an inclined beam. The invention is characterized by an arrangement preventing the deflection of light rays in case of small oscillations of the beam about its main axis of inertia.

Claims allowed - 4.

(1307) VORRICHTUNG ZUR ANZEIGE VON MECHANISCHEN, INSBESONDERE SEISMISCHEN SCHWINGUNGSVORGÄNGEN UNTER WASSER

(ARRANGEMENT FOR INDICATING MECHANICAL, ESPECIALLY SEISMIC, OSCILLATIONS UNDER WATER)

Askania-Werke A.-G. vorm. Centralwerkstatt Dessau und
Carl Bamberg-Friedenau of Berlin-Friedenau

German patent 556, 194 Patent issued August 4, 1932.

This invention is characterized by an arrangement in which, opposite to the membrane recording and transmitting the oscillations, a second membrane is inserted in such a manner that the water pressure, which is different at various depths, affects the two membranes with the same force; thus no change in the adjustment of the instrument in its position of rest results.

Claims allowed - 3.

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UNITED STATES BUREAU OF MINES
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MINING DIVISION

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Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1308) SULL'ANTICLINALE GRAVIMETRICA DI CASALPUSTERLENGO

(CONCERNING THE GRAVIMETRIC ANTICLINE OF CASALPUSTERLENGO)

By Arnaldo Belluigi

Bolletino della Societa Geologica Italiana, Rome, vol. 51, No. 2, 1932, pp. 217-220.

Some characteristics of the gravimetric anticline of Casalpusterlengo are given briefly; the phenomenon of the excess in the local gravity extends in the plain of the Po over a vast area of more than 40 km^2.

The connection of this phenomenon with the characteristics of the surrounding area is mentioned besides.--Author's abstract translated by W. Ayvazoglou.

(1309) INDIVIDUAZIONE DI UNA FAGLIA PROFONDA SUBPADANA NEI PRESSI DI RUDIANO (CHIARI)

(CHARACTERISTICS OF A DEEP FAULT IN THE LOWER PLAIN OF THE PO IN THE NEIGHBORHOOD OF RUDIANO (CHIARI)

By A. Belluigi

Atti della Pontificia Accademia delle Scienze Nuovi Lincei, Rome, vol. 84, 1931, pp. 709-713.

The results of gravimetrical examination of the zone to the northwest of Cremona in the neighborhood of Rudiano are reported.--W. Ayvazoglou.

(1310) SUL FENOMENO GRAVIMETRICO DI MIRANDOLA

(ON THE GRAVIMETRIC PHENOMENON OF MIRANDOLA)

By A. Belluigi

Bolletino del Comitato Nazionale Italiano per la Geodesia e la Geofisica, vol. 2, No. 9-10, 1932, 3 pp.

The author examines the configuration of isogams representing the gravimetric phenomenon of Mirandola. A map of isogams is given. The phenomenon was established by the torsion balance.--W. Ayvazoglou.

(1311) THE PRINCIPLES AND PRACTICE OF GRAVITY GRADIOMETER

By E. Lancaster-Jones

Journal of Scientific Instruments, London, vol. 9, Nos. 11 and 12, 1932,
pp. 341-353 and 373-380.

A description is given of the conditions in practical prospecting callng for a more portable and rapid-acting gravity balance and leading up to he design of the gravity gradiometer. The dynamics of the suspended system f a gravity balance are investigated and the dynamical characteristics of he gradiometer indicated. A detailed description of the original instrument ollows, with particulars of improvements incorporated in the latest pattern. inally, a review of the field performance, as regards sensitivity and ccuracy, of the gradiometer is given, with an account of a comparative test ade on it in conjunction with a standard type of torsion balance. The radiometer is shown to be a great improvement in the direction of portability nd rapidity of action, and the design entails very little sacrifice of ensitivity.

The latest pattern can be made five times as sensitive as the earlier odel, without diminution of the rapidity of action.--Author's abstract.

(1312) NEW INTEGROMETER FOR GEOPHYSICAL WORK

AMERICAN ASKANIA CORPORATION

Instruments, Pittsburgh, vol. 5, No. 11, 1932, p. 271, and Mining and
Metallurgy, New York, vol. 14, No. 313, 1933, p. 73.

A brief description of a new integrometer designed by the American skania Corporation is given. Its purpose is to determine fast and accuratey the gradients of gravity, as well as other gravity data through simple ntegration of a cross section in a given area.--W. Ayvazoglou.

(1313) GRAVITY OBSERVATIONS IN THE BAHAMA ISLANDS

By Joseph P. Lushene

Association of Field Engineers, U. S. Coast and Geodetic Survey, Bull.
5, June, 1932, pp. 98-100.

The islands on which observations were made were the Windward Islands of the Bahamas. The Mendenhall invariable half-second (quarter meter) pendulum apparatus was used. Of the 18 observations, 16 anomalies were negative and 2 positive. The striking feature that the anomalies on the Bahama Islands are negative, although a large majority of the island stations of the world show positive isostatic gravity anomalies, is explained by the author by the assumption that the Bahama Islands are not underlaid by igneous rocks and did not originate as the result of submarine igneous activity, since the reason for the positive anomalies of most of the islands is their formation of igneous rocks. The author concludes that in order to give the geologists and students of isostasy complete information of the West Indies, gravity observations in the Lesser Antillies are necessary.--W. Ayvazoglou.

2. MAGNETIC METHODS

(1314) PRESENTATION D'UNE NOUVELLE CARTE MAGNÉTIQUE DE LA PLAINE D'ALSACE

(PRESENTATION OF A NEW MAGNETIC MAP OF THE PLAIN OF THE ALSACE)

By C. Alexanian

Compte rendus des séances du groupe de géologues pétrolifiers de Strasbourg, vol. 1, No. 1-2, 1932, pp. 11-13.

Alexanian gives a map representing the variations of the vertical component of the field of the terrestrial magnetism between Haguenau and Mulhouse. This work was carried out during 1931 by using Haalck's variometer No. 36. The measurements were made at 374 stations; the distances between the stations varied from 2 to 4 km.

A brief summary of the results is given. Details will be published later.--W. Ayvazoglou.

(1315) SUR QUELQUES MESURES D'ANOMALIES MAGNÉTIQUES À MADAGASCAR

(SOME MEASUREMENTS OF MAGNETIC ANOMALIES AT MADAGASCAR)

By A. Savornin

Comptes rendus de l'Académie des sciences, Paris, vol. 195, No. 23, December 5, 1932, pp. 1101-1102.

Measurements of magnetic declinations were made in May and June, 1932.

The results of measurements, carried out at 23 stations, are given in a table. The causes of anomalies are briefly explained.--W. Ayvazoglou.

(1316) MAGNETIC DECLINATION IN NORTH CAROLINA IN 1930

By the Coast and Geodetic Survey

U. S. Department of Commerce, Coast and Geodetic Survey, Washington, Serial 537, 1932, 51 pp.

This article is one of a number of publications giving the results of observations, together with descriptions of the stations occupied, of magnetic surveys of the United States carried out by the Coast and Geodetic Survey.

Contents:

Introduction.
Definitions of terms.
Magnetic surveys in North Carolina.
Bibliography.
Compass surveys: (1) The compass as a surveying instrument; (2)
ljustment of compass; (3) compass correction; (4) true meridian; (5) mag-
etic stations; (6) secular change; (7) magnetic storms; (8) diurnal varia-
on; (9) local disturbance; (10) legislation; (11) retracing old compass
rveys.
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) description of stations; (5) isogonic chart.
List of stations.
Secular change of the magnetic declination (tables).
Values of magnetic declination, January 1, 1930.
Description of stations.--W. Ayvazoglou.

3. SEISMIC METHODS

(1317) INVESTIGATION OF THE METHOD OF OBTAINING THE DEPTH OF THE SEISMIC FOCUS AND OF THE VELOCITIES OF SEISMIC WAVES FROM THE OBSERVED DATA

By Y. Kodaira

The Geophysical Magazine, Tokyo, vol. 5, No. 2, 1932, pp. 97-121.

Theoretical considerations and methods of practical computation are dis-
ussed. The author concludes that the considerations given in this article
an be applied to the case that the earth changes its elastic properties only
n the direction of the radius vector from the center. But, owing to the
act that the elastic properties of the earth, especially near the surface,
re irregular, the considerations need some modifications. The formulas ob-
ained will therefore be unsuitable for the numerical calculation without the
ecessary modifications. The discussion of the question will be continued in
ne of the later issues of this magazine.--W. Ayvazoglou.

(1318) UNITED STATES EARTHQUAKES, 1931

By Frank Neumann

Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C.,
Serial No. 553, 1932, 26 pp.

This publication is a summary of earthquake activity in the United States
nd the regions under its jurisdiction for the calendar year 1931.--W.
yvazoglou.

(1319) THE THEORY OF THE INTERPRETATION OF SEISMIC TRAVEL-TIME CURVES IN HORIZONTAL STRUCTURES

By L. B. Slichter

Physics, Menasha, vol. 3, No. 6, 1932, pp. 273-295.

The theory of the interpretation of seismic travel-time curves for refracted rays in horizontal structures is treated after the manner of Herglotz-Wiechert, under the customary assumption that the ray paths obey the laws of geometrical optics. Multiple valued travel-time curves, discontinuous velocity functions, and the discontinuous travel-time curves associated with a slower speed bed receive special consideration. It appears that interpretations satisfactory from the theoretical point of view may be obtained in these cases, although, experimentally, sufficiently complete data to meet the requirements of theory may often be difficult or impossible to obtain.--Author's abstract.

4. ELECTRICAL METHODS

(1320) ELECTRICAL PROSPECTING

Editorial note

The Mining Magazine, London, vol. 47, No. 6, 1932, p. 363.

The discovery of a new quartz reef in Sumatra by prospecting with geoelectrical methods is mentioned. The potential method described by H. Hedström in the April number of the Mining Magazine (see Geophys. Abs. No. 40, p. 544) was employed and the results were gratifying, since an indication interpreted as caused by a high andesite ridge was obtained. After drilling about 50 meters a quartz reef was found in accordance with the prediction obtained from the electrical measurements.--W. Ayvazoglou.

(1321) REPORT OF THE WORK CARRIED OUT BY THE IRTYSH ELECTROMETRIC PARTY (IN RUSSIAN)

By V. Shpak

Transactions of the United Geological and Prospecting Service of U.S.S.R., Leningrad, 1932, No. 211, pp. 1-32.

The author gives a description of electrical investigations (resistivity method) carried out in connection with the erection of electric power station dams along the river of Irtysh. The purpose of investigations was to establish the structure of the bottom of the river. The work was started on December 2, 1931. During 78 days of actual work, observations were made at 2,980 points with about 452 points per square kilometer.

The party consisted of 20 men. A detailed list of the equipment required is given. The results are not yet confirmed by boring.--W. Ayvazoglou.

(1322) UNIT FOR SPECIFYING THE ELECTRICAL RESISTIVITY OF THE EARTH

By Livingston P. Ferris

Mining and Metallurgy, New York, vol. 14, No. 314, 1933, p. 99.

The author refers to Sherwin F. Kelly's paper, "A uniform expression for resistivity," (see Geophys. Abs. No. 35, p. 391) in which Kelly recommends that geophysicists adopt the expression and unit "ohm-meter" when speaking of electrical resistivities. Ferris says that telephone engineers and power engineers deal also with such a unit, but have adopted the term in reverse order "meter-ohm," largely because "ohm-meter" might be confused with the name of an instrument, "meter" being not only the name of a standard of length, but also a term used to designate a measuring device.

In a note added to this article Kelly writes: "The arguments advanced by Mr. Ferris against the term 'ohm-meter' and in favor of 'meter-ohm' seems to me to be convincing, and I am strongly in favor of its being accepted by geophysicists as the standard expression."--W. Ayvazoglou.

(1323) A NEW CONTRIBUTION TO SUBSURFACE STUDIES BY MEANS OF ELECTRICAL MEASUREMENTS IN DRILL HOLES

By C. and M. Schlumberger and E. G. Leonardon

Am. Inst. Min. and Met. Eng., New York, Technical Publication No. 503, 1932, 18 pp.

As previously stated (see Geophys. Abs. 35, p. 392, "Electrical coring"), the differences of potential spontaneously generated in drill holes are caused either by filtration of fluids through the porous layers or by osmotic electromotive forces generated at the contact of liquids that do not contain the same percentage of dissolved salts. According to the circumstances, one or the other of these phenomena takes a predominant place. When the electromotive forces of filtration distinctly play the capital role, it is possible to determine approximately the rock pressure inside the porous layers. On the other hand, when the osmotic forces constitute the essential basis of the phenomenon, it is the salinity of the water that can be measured. In the intermediate cases, the complexity of the phenomena makes it possible to give only a rough qualitative estimate of the pressure and the salinity. Whatever the conditions, however, the expression "porosity log" which has been given to the diagram of the differences of potential spontaneously generated in drill holes, is entirely justified, since this diagram puts into evidence, with great accuracy, all the porous layers traversed by the drill hole. Its practical utility for supplementing the information given by the resistivity diagram is evident. It plays an essential role in the detailed study of the oil and water zones, and is also very useful for the mere purpose of establishing geological correlations between the various formations, since very often the disturbances registered on the porosity log possess a characteristic silhouette.

As to the economic and statistical point of view, electrical coring can render valuable services for the exploitation of oil fields, where geological correlations are often very difficult to establish. The examples given, drawn from the work performed by the Soviet oil trusts, constitute very striking illustrations of this fact. The extensive drilling activity of these trusts, and the fact that they are supervised by a central management, has made it possible for them to develop this new technique in a remarkably rapid manner. In the fields of Sourakhany (Baku), Bibi-Eibat (Baku), and the New Field of Grozny, of which the total production represents 66 per cent of the U.S.S.R. Production, mechanical coring has been replaced almost entirely by electrical coring, which is much cheaper and quicker. In the fields of Leninsky Rayon (Baku), Maikop, and the Oil Field of Grozny, although electrical coring has not entirely eliminated mechanical coring, yet it plays a capital role there. The latter fields represent 24 per cent of the Soviet production. From these figures it is evident that electrical coring has either eliminated or considerably reduced mechanical coring for 90 per cent of the oil production of the Soviet Government.--Authors' abstract.

(1324) EXPANSION OF WITWATERSRAND GOLD FIELDS

Editorial note

The Mining and Industrial Magazine of Southern Africa, Johannesburg, vol. 15, No. 6, 1932, pp. 159-160.

Success obtained by electromagnetic method of prospecting carried out by Dr. Krahmann in locating the gold-bearing beds in the Witwatersrand gold fields will, according to this note, be of great value for determining the positions of the new boreholes and the sites for shaft sinking.--W. Ayvazoglou.

(1325) ZUM GEGENWÄRTIGEN STAND DER THEORIE DER DURCH MAGNETISCHE VARIATIONEN INDUZIERTEN ERDSTRÖME

(ON THE PRESENT TIME THEORY OF EARTH CURRENTS INDUCED BY MAGNETIC VARIATIONS)

By H. Ertel

Die Naturwissenschaften, Berlin, vol. 20, No. 47, 1932, pp. 860-862.

A brief examination of various theories concerning earth currents induced by magnetic variations is given.--W. Ayvazoglou.

5. RADIOACTIVE METHODS

326) TEMPERATURE EFFECT AND ITS ELIMINATION IN GEIGER-MÜLLER TUBE COUNTERS

By L. F. Curtiss

Bureau of Standards Journal of Research, Washington, D. C., vol. 10, No. 2, 1933, pp. 229-232.

It has been found that in the usual form of the Geiger-Müller tube counter ne rate of counting is affected by changes in temperature. The rate of count-ng, at a fixed potential applied to the tube, decreases as the temperature is ncreased. This indicates an increase in the density of the gas in the counter. ince it is hermetically sealed this can only be caused by evaporation of vola-ile material within the counter. The hard-rubber insulators commonly used in hese counters are practically the sole source of such volatile material; con-equently a form of counter has been devised in which only glass and metal are sed and which does not have its rate of counting affected by changes of emperature.--Author's abstract.

(1327) MEASUREMENTS OF IONIZATION IN THE KENNELLY-HEAVISIDE LAYER DURING THE SOLAR ECLIPSE OF 1932

By John T. Henderson

Canadian Journal of Research, Ottawa, vol. 8, No. 1, 1933, pp. 1-14.

The ionization of the Kennelly-Heaviside layer was measured by Appleton's ethod during the total solar eclipse of August 31, 1932. In contrast to ormal days, a sudden decrease of 58 per cent during the period of optical otality was found. This is shown to be in accord with Appleton's, but not ith Chapman's, theory that the cause of lower-layer ionization is ultra-iolet light from the sun. Some measurements were made of the effective eight of the Appleton layer and these are discussed in detail. There is a arked effect at the time of optical totality on this layer also--Author's bstract.

(1328) RADIO OBSERVATIONS ON THE UPPER IONIZED LAYER OF THE ATMOSPHERE AT THE TIME OF THE TOTAL SOLAR ECLIPSE OF AUGUST 31, 1932

By D. C. Rose

Canadian Journal of Research, Ottawa, vol. 8, No. 1, 1933, pp. 15-28.

This report contains the results from one of the three stations set up y the National Research Council of Canada to take observations on radio re-flections from the ionized layers in the upper atmosphere during the total olar eclipse of August 31, 1932.

The station concerned was located at Kingston, Ontario, and was approximately under the center of totality for the upper or Appleton layer. Hence observations at this station were limited to the upper layer. The results from the other two stations at Corner Brook, Newfoundland, and at Vankleek Hill, Ontario, are reported in the paper immediately preceding.

The method was that developed by Breit and Tuve, in which a short pulse is transmitted, the reflection being received and its time delay recorded by means of a cathode-ray oscillograph.

The results indicate that the ionization of the upper layer is caused by radiation (presumably ultra-violet light) from the sun. Whether or not this is the sole cause is uncertain because of the time lag in recombination of ions in the layer. A reduction in ionization of over 30 per cent was noted.

A magnetic storm which occurred a few days before the eclipse made the results more difficult to interpret but gave some information of the effect of such a storm on the upper layer. It appeared to cause considerable instability in the layer and a somewhat lower ion content.--Author's abstract.

(1329) DIE RADIOAKTIVITÄT UND DIE NEUEN PROBLEME DER GEOLOGIE

(RADIOACTIVITY AND THE NEW PROBLEMS OF GEOLOGY

By W. Vernadsky

Zeitschrift für Elektrochemie und angewandte physikalische Chemie, Berlin,
vol. 38, No. 8a, 1932, pp. 519-527.

In this article Vernadsky gives a brief critical review of the state of empirical information and the knowledge of fundamental data concerning the following three geological problems:

1. Geochemistry of lead.
2. Radioactive determination of geological epochs.
3. The radioactive map.

The history of lead atoms in the earth's crust is shown in a table.

The author emphasizes the necessity of systematic work for studying the age of the earth and for drawing a map showing the distribution of the radioactive energy.--W. Ayvazoglou.

(1330) RADIUM-UND MESOTHORIUMHALTIGE NATÜRLICHE GEWÄSSER

(NATURAL WATERS CONTAINING RADIUM AND MESOTHORIUM)

By V. Chlopin and W. Vernadsky

eitschrift für Elcktrochemie und angewandte physikalische Chemie, Berlin, vol. 38, No. 8a, 1932, pp. 527-530.

Results of detailed investigations of deep underground waters carried ut in a series of oil-bearing regions of the Soviet Union (Baku, Grozny, aikop, etc.), as well as in various mineral springs, by the Radium Research nstitute of Leningrad, are discussed.

A list of papers dealing with the question is added.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(1331) UNDERGROUND TEMPERATURE ON A HILL TOP

By Yosio Kodaira

The Geophysical Magazine, Tokyo, vol. 5, No. 1, 1932, pp. 89-95.

The present paper contains the results of mathematical investigations on he underground temperatures observed on a hilltop and of those at the same epth in a level tract of land.--W. Ayvazoglou.

(1332) EFFECT OF TEMPERATURE ON THE DEFORMATION OF INFINITE OR SEMI-INFINITE ELASTIC BODY

By H. Arakawa

The Geophysical Magazine, Tokyo, vol. 5, No. 2, 1932, pp. 139-146.

For the first paper published by the author under the same title, see ol. 4, No. 4, of this magazine (Geophys. Abs. No. 47). In this article rakawa treats mathematically the effect of the daily and annual changes of emperature in the earth crust. He concludes that:

1. There are also daily and annual changes of the deformation of the earth crust.

2. The magnitudes of deformation at the surface are 10^{-3} cm for a day and 10^{-1} cm for a year, at most.

3 The magnitude of deformation decreases exponentially as the depth increases.

4. The phase difference between the corresponding harmonics of temperature and deformation is $\frac{\pi}{4}$; i.e., 3 hours for the daily change and 1.5 months for the annual change.--W. Ayvazoglou.

(1333) LAS MEDIDAS GEOTERMICAS EN LOS PAZOS

(GEOTHERMIC MEASUREMENTS IN WELLS)

By D. Chahnazaroff

Petroleos y Minas, Buenos Aires, vol. 13, No. 141, 1933, pp. 5-7.

Geothermic measurements in wells can be made by various methods depending on the purpose of observation.

If a thermo-survey, by which the thermic horizons of the well are to be determined during one day is required, an apparatus with automatic registration of temperature should be used; in this case the accuracy of temperature obtained may be equal to 1 to 1 1/2° C.

If an accuracy of 1/4 to 1/3° C. is desired, maximum thermometers or open-tube thermometers without a graduation scale must be used; the latter are constructed on the principle that each drop of mercury which is flowing out of the open end of the thermometer corresponds approximately to 1/3° C.; the maximum thermometers are less convenient as more time is required for carrying out the observations. If an accuracy equal to 2/10° C. is endeavored the thermoelectric method, which is now sufficiently improved, is rapid, and gives accurate results, should be applied.—W. Ayvazoglou.

(1334) ÉTUDE DES EAUX PÉTROLIFÈRES

(STUDY OF PETROLEUM WATERS)

By D. Chahnazaroff

Les matières grasses, June 15, July 15, and August 15, 1932, pp. 9538-39, 9587-89 and 9615-17.

A diagram representing each water-bearing level as a function of salinity and temperature is given.

A vertical graph is constructed of the dispositions and successions of waters in each individual well. A method of systematizing data from known and unknown regions is indicated.

The following formula is given for calculation of the geothermic degree of the terrestrial envelope in a boring:

$$Dg = \frac{S}{T - t}$$

where S = absolute depth in meters of the bed; T = registered temperature; t = mean annual temperature of the region. By taking values of Dg for different wells, geoisothermic graphs can be constructed.

Methods of physical, chemical, and hydrological investigation of petro-eum waters, the degree of their mineralization, and the temperature of waters n situ are discussed.—W. Ayvazoglou.

(1335) SUR LE DEGRÉ GÉOTHERMIQUE EN LIMAGNE

(THE GEOTHERMIC GRADIENT IN LIMAGNE)

By G. Grenet

Comptes rendus de l'Académie des sciences, Paris, vol. 195, No. 25, December 5, 1932, pp. 1100-1101.

A 200-meter boring was used for determining the geothermic gradient at acholles, near Riom. The temperature was measured at a depth of 192.2 m. he geothermic gradient was found to be equal to 14.16 m. The result was in ood agreement with the earlier observations at Macholles, confirming the ypothesis that the geothermic degree over the greater part of Limagne is of he order of 14 m.—W. Ayvazoglou.

(1336) ON THE FLOW OF HEAT FROM A ROCK STRATUM IN WHICH HEAT IS BEING GENERATED

By C. E. Van Orstrand

ournal of the Washington Academy of Sciences, Baltimore, vol. 22, No. 20/21, 1932, pp. 529-539.

A mathematical discussion of the question under the assumption that the arth is a cooling globe and that the strata are parallel to the horizontal urface of the ground is given. The results of calculations are represented n curves and tables.—W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1337) ARGENTINE PETROLEUM INDUSTRY AND THE EFFECTS OF THE NATIONALIZATION POLICY

By Mark C. Malamphy

The Oil Weekly, Houston, vol. 16, No. 5, 1933, pp. 14-22.

Geophysical investigations (seismic, gravitational, and magnetic methods) carried out in the eastern part of the Provincia de Salta, Comodoro Rivadavia area, and the Plaza Huincul district are mentioned briefly.—W. Ayvazoglou.

(1338) ERDÖL UND GEOPHYSIK IN NORDWESTDEUTSCHLAND

(OIL AND GEOPHYSICS IN NORTHWESTERN GERMANY)

By Otto Barsch

Zeitschrift der Deutschen geologischen Gesellschaft, Berlin. vol. 84, No. 6, 1932, pp. 437-449.

In this lecture, delivered by the author at the petroleum meeting held in Hanover on May 5, 1932, the importance of geophysics as an aid of geological prospecting, especially with respect to prospecting for oil, is discussed.

Torsion balance measurements, magnetic, seismic, electrical, and radioactive methods of prospecting are examined and illustrated by examples of practical achievements.--W. Ayvazoglou.

(1339) DIE ISANOMALENKARTE DER MAGNETISCHEN VERTICALINTENSITÄT VON MECKLENBURG UND DIE NEUE KOSSMAT'SCHE KARTE DER SCHWEREANOMALIEN NORDWESTDEUTSCHLANDS

(MAP OF ISANOMALIES OF MAGNETIC VERTICAL INTENSITY OF MECKLENBURG AND THE NEW KOSSMAT'S MAP OF GRAVITY ANOMALIES OF NORTHWESTERN GERMANY)

By Fr. Schuh

Zeitschrift der Deutschen geologischen Gesellschaft, Berlin, vol. 84, No. 6, 1932, pp. 449-454.

The author compares the results of his magnetic investigations carried out in southern Mehlenburg with the results obtained by Kossmat as shown in the latter's map of gravity anomalies. Schuh concludes that although this comparison was not carried out in all details, the importance of geophysical prospecting for the explanations of geological and structural conditions of the subsoil must be considered to be proved.--W. Ayvazoglou.

(1340) LES PROBLÈMES DES GISEMENTS PÉTROLIFÈRES

(OIL-FIELD PROBLEMS)

By E. Dimitriu

Annales des mines de Roumanie, Bucharest, vol. 15, Nos. 7, 8, and 10, 1932, pp. 239-243, 281-287, and 363-370.

In the chapter "Geological problems" the section devoted to prospecting deals mainly with geophysical investigation. Various methods, and the geological conditions to which each method is best adapted, are described. The necessity for trained and experienced men to interpret the results is stressed.

The possibility of eliminating the mechanical coring and of using Schlumberger's method of electrical well prospecting is discussed. This system has been employed recently in Rumania with success.

Physical problems, effects of temperature, and technical problems of exploitation are considered.—W. Ayvazoglou.

(1341) THE LOCATION OF A CONCEALED WHIN DIKE BY GEOPHYSICAL SURVEYING

By Granville Poole, J. T. Whetton, and J. Carr

Transactions of the Institution of Mining Engineers, London, vol. 84, No. 4, 1933, pp. 198-221.

Contents:

1. Introduction.-- Methods of geophysical surveying are briefly examined; physical properties of geological structures and corresponding instruments for elucidating them are tabulated.

2. The 4-electrode method.-- The two main methods of using the 4-electrode system, (1) center of electrode system fixed, and (2) center of electrode system moved, were used in the present investigation, but most of the work of tracing the dike was done by what the authors term the "step-traverse method."

3. Application of the resistivity method to the tracing of the Coley Hill Dike.-- The investigation was concerned with a part of the dike in the neighborhood of the disused quarry at Coley Hill.

4. The "Step-traverse method."-- Laboratory experiments preceding the field investigations are described. A map showing traverse lines and the position of dike as traced by the geophysical survey in relation to proved position underground, a graph from fieldwork results, and a table showing the "Megger" readings for "step-traverse" survey are given.

5. Interpretation of individual traverse lines.

6. Magnetic survey.-- Watts' magnetic variometer is described. This method was applied in order to check the resistivity survey; several traverses were made. According to the authors the speed of the resistivity method was about the same as that of the magnetic method, but the precision of the latter was greater.

7. Examination of results and comparison with information obtained from colliery workings.-

(a) The North Walbottle Colliery: There was excellent agreement between the line proved by the workings and the line traced on the surface by the geophysical method.

(b) The Trockley Colliery: The results obtained here show the advisability of using more than one geophysical method.

(c) Montagu Colliery: Good agreement with the line traced by the geophysical method was obtained.

According to the authors the results of the survey of a dike in the locality described show that magnetic and electrical methods may be of direct use to coal owners.--W. Ayvazoglou.

(1342) ON THE DISTRIBUTION OF MASSES, PRESSURES AND DENSITIES IN THE EARTH AND ON THE EARTH'S MEAN CHEMICAL COMPOSITION (IN RUSSIAN)

By P. N. Chervinsky and V. K. Cherkas

Transactions of the Mineralogical Institute of the Academy of Sciences of the U.S.S.R., No. 1, 1931, pp. 103-119.

The authors discuss the question of the zonal structure of the earth as well as of the mean chemical composition of the earth.--W. Ayvazoglou.

(1343) GEOPHYSICAL WORK IN THE OIL FIELDS

By Paul Weaver

Mining and Metallurgy, New York, vol. 14, No. 313, 1933, pp. 29-30.

The increase of geophysical surveying during 1932, particularly in the Gulf Coast region of Texas and Louisiana, is noticed. Gravity and reflection seismograph surveys were used almost exclusively. According to the author, the total number of geophysical troops in this territory increased from 16 to 40 during the year.

The reflection-seismograph survey was used for the construction of subsurface contour maps as a guide to the development and extension of proved fields and to the location of wildcat wells on new prospects. Another form of seismograph investigation has been the outlining of the edge of certain salt domes. This has been accomplished in part by placing the "detectors" in deep wells which have already been completed and investigating the asymmetry of the wave train in different directions.

The total outlay for gravity and seismograph surveys in the Gulf Coast region is now approximately $175,000 per month. Considerable experimental work is carried on in laboratories to develop instruments used in gravity and seismic surveys.--W Ayvazoglou.

(1344) GEOPHYSICS IN THE MINING AND GEOLOGICAL FIELDS

By Sherwin F. Kelly

Mining and Metallurgy, New York, vol. 14, No. 313, 1933, pp. 30-31 and 42.

The author gives a review of work carried out during 1932 by various organizations and scientists in connection with geophysical prospecting. The most outstanding features concerning laboratory work and fieldwork, as well as the publications which have appeared, are discussed.--W. Ayvazoglou.

(1345) IMPORTANT DEVELOPMENT ON THE FAR WEST RAND GOLD AREAS

Editorial note

The Mining and Industrial Magazine of Southern Africa, Johannesburg, vol. 15, No. 5, 1932, pp. 119-122.

Valuable results obtained from boring in conjunction with geophysical prospecting in the far-west Rand gold areas are reported.--W. Ayvazoglou.

(1346) THIRTEENTH ANNUAL MEETING OF THE AMERICAN GEOPHYSICAL UNION

By J. A. Fleming

Science, New York, vol. 76, No. 1972, October 14, 1932, pp. 346-349.

A brief report is given on the thirteenth annual meeting of the American Geophysical Union held in Washington on April 28 and 29, 1932. The report contains the texts of the 10 resolutions passed by the Union.

The author refers to the complete "Transactions" of this meeting, edited and published by the General Secretary of the Union as a special publication of the National Research Council (see Geophys. Abs. 41, pp. 592-595).--W. Ayvazoglou.

(1347) MANY HAZARDS AND UNCERTAINTIES IN GULF COAST OPERATIONS BUT REWARDS ESPECIALLY GOOD

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 31, No. 35, 1933, pp. 6 and 36.

Under the heading, Geophysical Investigation, Williams says that there is no part of the country in which the services of geophysical machines have been used so extensively as in the Gulf Coast area, but more attention must be paid to careful survey work on the coast than in any other district.

There are unlimited possibilities for an explorer using the best aid and equipment available.--W. Ayvazoglou.

(1348) GEOPHYSICAL APPARATUS

By H. Shaw and E. Lancaster Jones

Journal of Scientific Instruments, London, vol. 9, No. 3, 1932, pp. 85-86.

The authors give a few examples of new developments or novel applications of theoretical considerations which have the effect partly of overcoming practical deficiencies hitherto existing in geophysical apparatus and partly of enabling new results to be obtained.--W. Ayvazoglou.

9. NEW BOOKS

(1349) Bowie, William. Comments on isostasy made by authors of geological and geophysical books and papers. Issued in mimeograph form. National Research Council, Washington, D. C., 1932, 49 pp. This compilation contains 65 titles. No comments are made on the views quoted. The reader is given full information as to the title of books, reports, or papers, and where and when published.

10. PATENTS

(1350) METHOD OF EXPLORING GROUND

Heinrich Löwy, of Vienna, Austria

United States patent 1,864,024 Patent issued June 21, 1932.

This invention relates to an improved method of exploring the ground for determining therein the existence, the depth below the ground, and, with some restrictions, also the nature of strata under the surface of the ground differing in electric properties from the surface. The method determines the natural wave length and the damping resistance of an overground high frequency oscillation circuit of given constants at a point of the ground to be explored.

Claims allowed - 2.

(1351) ELECTRICAL DEVICE FOR THE DETERMINATION OF SPECIFIC RESISTIVITY

Conrad Schlumberger, of Paris, France

United States patent 1,894,328 Patent issued January 17, 1933.

An electrical device for determining the nature of the geological formations traversed by a drill hole, comprising two electrodes placed at a known and small distance from one another in the water filling the uncased part of the said drill hole; means for varying the depth of these two electrodes in the drill hole; means for measuring the current flowing in the circuit constituted when one of these two electrodes is connected by an insulated wire to a source of current whose other pole is earthed; means for measuring the ifference of potential thus created between the second electrode in the drill ole and a third electrode in contact with the surface of the soil, such means eing connected by insulated wires to the two electrodes, whereby an approxi-ate value for the resistivity of the earth at the depth of the two electrodes nside the drill hole can be deduced.

Claims allowed - 1.

1352) A NEW METHOD OF ELECTRICAL GEOPHYSICAL PROSPECTING AND SURVEYING AND APPARATUS FOR USE THEREIN

Henry Tinsley and Douglas Crisp Gall, both of Werndee Hall, South Norwood, London, and Arthur Broughton Edge, of Australia House, The Strand, London.

British patent 378,056 Patent issued July 26, 1932.

This invention relates to a method for determining the nature of the subsoil and for detecting the presence of minerals, metals, and metalliferous deposits. The alternating current is applied to the area in question by means of ground electrodes and a current-carrying loop, to determine, first, a series of lines of equal in-phase potential by means of apparatus comprising a pair of portable ground electrodes connected in circuit with means for indicating potential difference, the portable ground electrode circuit including a coil which can be orientated to pick-up quadrature potential from the electromagnetic field for the purpose of balancing out any quadrature potential while locating the points of equal in-phase potential on the lines; and second, a series of lines of equal quadrature potential with respect to the first series of lines by means of apparatus capable of indicating potential differences. These two series of lines are plotted and the information desired is determined therefrom.

Claims allowed - 21.

(1353) IMPROVEMENTS IN ELECTRICAL APPARATUS FOR GEOPHYSICAL SURVEYING

Frederick Gilbert Laughton Scott, of London

British patent 381,695 Patent issued June 17, 1932.

This invention relates to improvements in apparatus for geophysical surveying by the electrical method, wherein electric impulses are passed through the area being surveyed, and the distribution of such impulses throughout such area is determined by the aid of a telephonic receiver--for instance, connected to exploring earth pins or to an exploring inductive loop--and the presence of orebodies is deduced by the departure of such distribution from the normal distribution.

Claims allowed - 2.

(1354) IMPROVEMENTS RELATING TO TORSION BALANCES FOR GEOPHYSICAL MEASUREMENTS

Standard Oil Development Co., a corporation duly organized and existing under the laws of the State of Delaware, United States of America.

British patent 381,892 Patent issued October 13, 1932.

This invention comprises the application to the torsion balance of the Kelvin bifilar suspension mirror instead of the usual mirror at the center of the balance beam, whereby the practical applicability of the torsion balance is greatly increased.

Claims allowed - 3.

(1355) IONISATIONSKAMMER ZUR MESSUNG DER IN EINEM GASRAUM DURCH DIE WELLEN, BZW. KORPUSKULARSTRAHLEN HERVORGERUFENEN IONISATION UND INSBESONDERE FÜR DIE UNTERSUCHUNGEN, DIE AUF SELEKTIVER, VON EINEM IN DER KAMMER EINGESCHLOSSENEN PRÜFKÖRPER AUSGEHENDER SEKUNDÄRSTRAHLUNG BERUHEN

(IONIZATION CHAMBER FOR MEASURING IONIZATION PRODUCED IN A GASEOUS SPACE BY WAVE-RADIATION OR CORPUSCULAR RADIATION AND ESPECIALLY FOR INVESTIGATIONS BASED ON SELECTIVE SECONDARY RADIATION EMITTED FROM TEST BODIES INCLOSED IN THE CHAMBER)

Dr. Friedrich Dessauer of Frankfort on the Main

German patent 559,243 Patent issued September 23, 1932.

This invention relates to the application of a principle by which the elimination of harmful wall radiation is obtained. The wall radiation is reduced to a minimum by building the walls of two or more layers of such kinds of material, owing to the properties of which the radiation emitted by one layer is absorbed by the other.

Claims allowed - 2.

(1356) EINRICHTUNG ZUR MECHANISCHEN REGISTRIERUNG BEI GEOLEKTRISCHEN UNTERSUCHUNGEN MIT EINEM KOMPLEXEN WECHSELSTROM KOMPENSATOR

(DEVICE FOR MECHANICAL REGISTRATION IN GEOELECTRIC INVESTIGATIONS CARRIED ON WITH A COMPLEX ALTERNATING CURRENT COMPENSATOR)

Prospector-Institut für praktische Geophysik und Geologie Dr. Hülsenbeck
and Co., of Frankfort on the Main

erman patent 559,452 . . . . Patent issued September 20, 1932.

This invention relates to a device for mechanical registration, at ingle points of measurement, upon a test-record sheet, of the maximum values f the energy component of the current and of the wattless component of the urrent of the alternating-current field produced in the ground by probes or nduction coils during geoelectric investigations carried on with a complex lternating-current compensator.

Claims allowed – 3.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1357) UNTERSUCHUNGEN ÜBER DIE ZEITLICHEN ÄNDERUNGEN DER SCHWERKRAFT: 1. MESSUNGEN MIT DEM BIFILARGRAVIMETER

(INVESTIGATIONS CONCERNING THE TEMPORAL CHANGES OF GRAVITY: 1. MEASUREMENTS WITH THE BIFILAR GRAVIMETER)

By R. Tomaschek and W. Schaffernicht

Annalen der Physik, Leipzig, vol. 15, No. 7, 1932, pp. 787-824.

In this article the authors describe the execution of the measurements carried out for investigating the temporal changes of gravity and give the results obtained by these measurements. The question is discussed under the following items:

1. Principle of the arrangement: (a) Historical outline; (b) principles of the theory of the apparatus; (c) construction of the apparatus; (d) adjustment of the gravimeter; (e) setting up of the gravimeter; (f) handling of spiral springs; (g) interpretation of the results of observations.

2. General results: (a) Influence of cosmic movement of the earth; (b) influence of the sun and of the moon.

3. Harmonic analysis of gravity movements: (a) Steps taken during the analysis; (b) amplitude ratios and phase lag; (c) conclusions on the flowing movement of the solid earth.

The article is illustrated by schematic designs of the bifilar gravimeter, curves, and tables.--W. Ayvazoglou.

(1358) THEORY OF THE TORSION BALANCE; WITH A PRELIMINARY STUDY OF A MODIFICATION OF THE INSTRUMENT TO DECREASE TIME OF GRAVITY MEASUREMENTS

By J. Wallace Joyce

U. S. Department of Commerce, Bureau of Mines, Washington, D. C., Technical Paper 546, 1933, 46 pp.

Definite purposes for the preparation of this paper are summed up by the author as follows:

1. To present a theoretical discussion of the principles and properties of the gravity field and the interrelation of the physical quantities involved to the torsion-balance equation.

2. To consider some of the practical features of the torsion balance.

3. To describe an investigation of the problem of reducing the free period of the balance system.

Author's conclusions: "Torsion balances in their present form show periods of oscillation lasting from 14 to more than 30 minutes. Obtaining observations therefore requires considerable time, and temperature changes prove troublesome. By making the torsion balance a zero instrument by the addition of a fine restoring fiber and adapting the optical method of detecting small angular deflections described in this report, balances can be produced with periods of less than 30 seconds without lowering the present standards of sensitivity."--W. Ayvazoglou.

(1359) SULL' INTERPRETAZIONE DELL' ISANOMALE GRAVIMETRICHE

(ON THE INTERPRETATION OF GRAVIMETRIC ISANOMALIES)

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 2, 1933, pp. 230-235.

The author gives a general method for the calculation of the depth from the lines of equal gravity disturbance. Belluigi expresses the opinion that the application of his method can be made considerably more clear by using his "multiplication-net." The limits of application of his method in connection with different methods are discussed.--W. Ayvazoglou.

2. MAGNETIC METHODS

(1360) GENERAL MAGNETIC SURVEY IN 1931 (IN RUSSIAN)

By V. P. Orlov

Bulletin de l'Observatoire Geophysique Central, Leningrad, No. 3-4, 1931, pp. 43-45.

The author gives some information on the magnetic survey carried out on the territory of the U.S.S.R. in 1931. Measurements of all the three elements of the earth's magnetic field (declination, inclination, and horizontal component) were made at 827 stations. An area of about 350,000 square kilometers was covered. Seven considerable magnetic anomalies were established; those in the Urals and the Kuznetsk Basin, caused by ore deposits, may be of importance and will be investigated in detail.

According to the plan, more than 3,000 stations will be investigated in 1932.--W. Ayvazoglou.

(1361) DISTRIBUTION OF TERRESTRIAL MAGNETIC ELEMENTS AND THE STRUCTURE OF EARTH'S CRUST IN JAPAN

By Torahiko Terada

Proceedings of the Imperial Academy, Tokyo, vol. 9, No. 1, 1933, pp. 3-5.

The results of calculating the distribution of the values of the terrestrial magnetic elements in Japan and Korea are shown in three figures. The area of the negative anomaly is given in the fourth figure.--W. Ayvazoglou.

(1362) ZUSAMMENFASSENDE BEARBEITUNG UND DARSTELLUNG DER MAGNETISCHEN DECLINATION IN ÖSTERREICH, BÖHMEN UND MÄHREN-SCHLESIEN ZUR EPOCHE 1930, 0

(COMPREHENSIVE ELABORATION AND REPRESENTATION OF THE MAGNETIC DECLINATION IN AUSTRIA, BOHEMIA AND MORAVIA-SILESIA FOR THE EPOCH 1930.0)

By A. Schedler

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 3, No. 2, 1933, pp. 205-210.

As the result of calculating and plotting the distribution of the declination in Austria, Bohemia, and Moravia-Silesia it appears that the known anomaly in northern Lower-Austria is related to an area in Moravia which is strongly perturbated. The author states that the Sudeten region is magnetically much more perturbated than the region of the East-Alps.--Author's abstract

(1363) ÜBER FELDERFAHRUNGEN MIT EINEM TEMPERATURKOMPENSIERTEN MAGNETSYSTEM IN EINER SCHMIDTSCHEN FELDWAAGE

(CONCERNING FIELD EXPERIMENTS WITH A TEMPERATURE-COMPENSATED MAGNET SYSTEM IN SCHMIDT'S FIELD BALANCE)

By H. Reich

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 3, No. 2, 1933, pp. 253-258.

The author made a 4-week experiment with the Schmidt balance with compensated magnetic system. The results obtained showed that the base value and the value per division of the scale were practically constant. In the course of the survey the temperature varied from 11° to 32°; within this interval no influence of the temperature of any practical value was observed. --Author's abstract.

3. SEISMIC METHODS

(1364) ON THE ELASTIC CONSTANTS OF ROCKS, WITH A SEISMIC APPLICATION

By T. C. Richards

The Proceedings of the Physical Society, Cambridge, vol. 45, Part 1, No. 246, 1933, pp. 70-81.

The results of a geophysical survey by means of the seismic method over a large oil-bearing limestone structure in southwest Persia indicate that the limestone possesses a higher elastic velocity at its lower boundary than at its upper. Specimens of the limestone at different depths obtained by coring do not give the same elastic constants when measured by a simple optical method, and the bearing of this result on the practical seismic observation is discussed.--Author's abstract.

(1365) THE THEORY OF REFRACTION SHOOTING

By Morris Muskat

Physics, Lancaster, Pa., vol. 4, No. 1, 1933, pp. 14-28.

Considerations on geometrical optics indicate that the limiting rays traveling along the interface between two homogeneous elastic media should carry inappreciable amounts of energy. Nevertheless, the "first arrival" waves in refraction shooting processes, which give linear time distance curves, are usually interpreted as being due to such limiting rays traveling along the interface with the velocity of the lower medium. To clear up the situation an analysis of the problem has been made both from the points of view of geometrical optics and wave theory. It is pointed out that although the assumed "refraction" paths are minimal time paths in the sense of Fermat's principle, the applicability of the latter along a surface of discontinuity may be open to question. On the other hand, it is proved that geometrically they are necessarily real, since they are the only type of path that can give the observed linear time-distance curves. The wave-theory treatment of the problem for fluid media modified slightly from the operator method analysis previously given by Jeffreys, is then presented to show that the wave theory actually gives waves whose geometrical interpretations are exactly those of the refraction shooting process. Their amplitudes vary inversely as the square of the distance from the source and they give vertical displacements of the same order as those of the directly reflected waves. The analysis is extended to the case of general elastic media and it is shown that four types of "refracted" waves will be produced upon the incidence at the interface of either a longitudinal or transverse wave pulse. Two of the waves will be recorded as longitudinal waves and the other two as transverse. One of each pair effectively travels in the second medium with the longitudinal velocity of the medium and the other two travel with the transverse velocity of the lower medium. The velocities and accelerations produced by these "refracted" waves will vary over the pulse thickness exactly as the displacements and velocities in the incident pulse.--Author's abstract.

(1366) ON THE DEDUCTION OF THE EQUATION OF A HORIZONTAL SEISMOGRAPH (IN RUSSIAN)

By P. T. Sokolov

Transactions of the United Geological and Prospecting Service of U.S.S.R., Leningrad, 1932, No. 213, pp. 1-8.

A simplified deduction of the equation of a horizontal seismograph with an inclined axis of rotation is given. The deduction is based on the principle of conservation of energy.--Author's abstract.

(1367) EXPERIMENTAL APPLICATION OF ARTIFICIALLY GENERATED ELASTIC WAVES TO PROBLEMS OF GEOLOGICAL PROSPECTING (IN RUSSIAN)

By P. Sokolov

Transactions of the United Geological and Prospecting Service of U.S.S.R., Leningrad, 1932, No. 214, pp. 1-30.

In this paper the author gives a report on the organization of prospecting work carried out by the seismic method in Kazakstan, Chusovskie Gorodki, and Chikishliar in 1930.

The results are discussed.

Two field parties provided with nine Schweydar instruments covered an area of over 500 square kilometers; 300 kilometers of seismic profiles were drawn.

In the Temir district (Kazakstan) salt domes were disclosed and depths could be defined. The results coincided closely with the data obtained by borings. In the Mortuk and Djalan-Agash regions the contours of the roofs of salt deposits were plotted. The results of seismic surveying in Mortuk were especially clear.

The possibility of application of seismic prospecting to limestone horizons overlain by anhydrites, and of determining the general character of subsurface structure was established by the work in Chusovskie Gorodki.

The key horizon was established in alluvial deposits in Chikishliar at a depth of 800 to 900 meters; based on this horizon the structure in the region of Mount Kipiashchi Bugor could be determined.

The author gives the following data for the speed of the longitudinal waves, as obtained during the work:

	Meters per second
1. Salt	4,500 to 4,600
2. Limestone (Carboniferous)	6,000
3. Anhydrite (varying highly)	4,000 to 5,000
4. Clay (Cretaceous age)	2,400 to 2,800
5. Alluvial	1,200 to 500

A brief historical outline of the application of the seismic method of rospecting in the U.S.S.R. and in some other countries is given in the be-nning of the article.--W. Ayvazoglou.

(1368) AVERAGE-SPEED METHOD IN SEISMIC PROSPECTING (IN RUSSIAN)

By P. M. Karatygin

Transactions of the United Geological and Prospecting Service of U.S.S.R., Leningrad, 1932, No. 213, pp. 9-13.

The author describes a new method of calculating depths in seismic pros-ecting on the basis of the average speed, which in the case of a threefold tructure he determines by the following formula:

$$V_{cp} = \frac{h_1 + h_2}{\frac{h_1}{v_1} + \frac{h_2}{v_2}}$$

n which h_1 and h_2 represent the depths of location of the first and second trata, v_1 and v_2 the corresponding speeds.

This method is of special importance in the case of the following inter-elation of the speeds:

$$v_3 > v_1 > v_2$$

In this case the stratum with a speed of transmission equal to v_2 scapes the observation, thus leading to serious errors in the determination f the depths.

The author proves that with the average-speed method these errors are voided. The method described by the author has been applied by him in ield, the value V_{cp} having been found experimentally by firing a shot at he bottom of a deep borehole.--Author's abstract.

(1369) NEW METHOD OF SEISMIC INTERPRETATION (IN RUSSIAN)

By M. V. Vasiliev

Transactions of the United Geological and Prospecting Service of U.S.S.R.,
Leningrad, 1932, No. 213, pp. 14-19.

The author gives a new method of seismic interpretation in case of a cylindrical orebody with small angles of dip (8° to 15°) in which he applies an artificial way of representing the orebody as a system of steps. This method can also be used in case of three ore beds.--Author's abstract.

(1370) CONTRIBUTION TO THE PROBLEM OF INTERPRETATION OF THE RESULTS OF SEISMIC SURVEYING FOR THE CASE OF ONE CONTACT (IN RUSSIAN)

By P. T. Sokolov

Transactions of the United Geological and Prospecting Service of U.S.S.R.,
Leningrad, 1932, No. 213, pp. 20-26.

The author develops a number of considerations concerning the interpretation of the results of seismic surveying of the subsurface reliefs with angles of dip not exceeding 10° to 15°. Based on the Fermat law of the distribution of elastic waves he proves the possibility of determining the difference of depths δH of the relief from the difference δt between the ordinates of the actual distance traversed and those of the distances traversed along a horizontal seam constructed for a depth taken as the initial one. For this he gives the following formula:

$$\delta t = \frac{\delta H}{V_1} \quad \cos\alpha$$

in which δH is the difference in depths, δt the time difference according to the distances traversed, and

$$\alpha = \text{arc} \quad \sin \quad \frac{V_1}{V_2}$$

The author estimates the accuracy of this method and shows its advantages as compared with Meissner's method of inclined distance traversed.

The described method is also applicable to faulted reliefs, the amplitude of the faults being also determined by it.--W. Ayvazoglou.

(1371) SEISMIC PROSPECTING FOR OIL

By Kirtley F. Mather

Mining and Metallurgy, New York, vol. 14, No. 315, 1933, p. 166.

A brief summary of Mather's lecture, held at the Boston Section of the American Institute of Mining and Metallurgical Engineers on February 6, 1933, on the subject "Dynamitizing for oil," is given by F. L. Foster. It reads as follows:

> Professor Mather presented the basic principles of seismic prospecting in a most comprehensive manner and showed how important their application has been in the search for petroleum structures. He described the apparatus required and the field procedures followed, illustrating his entire lecture with approximate lantern slides. One reel of motion pictures showed Dr. L. Don Leet of Harvard and his assistants carrying on seismic field work on the granites of Rockport and Quincy, Mass., and of Westerly, R. I. The purpose of this investigation was to determine the speed at which the seismic waves travel in granite. The excellent results obtained were presented in some detail. In conclusion, Dr. Mather described several applications of seismic prospecting in Texas and Louisiana, showing the field results, their interpretation and correlation with later drilling records.

(1372) CORRELATION OF REFLECTION SEISMOGRAPH RECORDS IN CALIFORNIA

By Henry Salvatori

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 17, No. 3, 1933, pp. 257-268.

Reflection records in California can not always be correlated on the basis of character, interval, et cetera. In those areas where the reflecting strata are not persistent or are subject to lateral changes in physical character a knowledge of the slope of the strata is essential for the proper interpretation of the records. A brief outline of a method for determining the dip of a reflecting surface is presented and the manner in which this method may be utilized to aid in the correlation of records is indicated. The major areas of California offering possibilities for reflection work are classified according to their geologic sections into two general groups, and typical reflection records secured in an area of each group are reproduced and discussed.--Author's abstract.

4. ELECTRICAL METHODS

(1373) CONCERNING THE NATURE OF SPONTANEOUS POLARIZATION (IN RUSSIAN)

By E. Claudet

Azerbaijanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 12, 1932, pp. 55-61.

Based on the experiments carried out in boreholes of the Baku oil region the author established a new hypothesis according to which spontaneous polarization is negative when the salinity of waters of the solution in the borehole is less than that of the stratum waters, and is positive in the opposite case. Its amplitudes are functions of the value of the difference between the salinity of the solution in the borehole and the salinity of the stratum water. These results may be of aid for establishing oil-bearing strata and, in particular, the water-bearing strata.

Besides, based on the diagram showing ohm resistances, the nonporous strata of high resistance can be distinguished from porous strata of high resistance, the latter being usually horizons saturated with oil.--
W. Ayvazoglou.

(1374) LES COURANTS ÉLECTRIQUES NATURELS DE L'ÉCORCE DE LA TERRE ET LEUR RAPPORT AVEC LE MAGNÉTISME TERRESTRE

(NATURAL ELECTRIC CURRENTS WHICH FLOW IN THE EARTH'S CRUST AND THEIR RELATION TO THE TERRESTRIAL MAGNETISM)

By O. H. Gish

Prepared for the International Electrical Congress, Paris, July, 1932,
Section 11, Communication No. 1-C-2, 21 pp.

A resolution passed by the International Electrical Congress at Paris 50 years ago stimulated the investigation of the natural electric currents (earth-currents) which flow in the earth's crust. Important advances in the knowledge of this class of phenomena have been made since that time. These are briefly described and the principal conclusions which at present seem justified are stated. Some of these conclusions follow:

(a) The measurements of earth currents give no evidence of the existence of electric currents of such character and magnitude as would be required to produce the major part of the earth's magnetic field.

(b) The regular diurnal changes in earth currents are approximately of the character to be expected if these and diurnal variations in the earth's magnetism are induced by a system of electrical currents in the high atmosphere.

(c) The relation between the irregular changes, disturbances, and so-lled storms of earth currents and the corresponding magnetic changes is ten not of the character found for the diurnal variation, but is rather at which would be expected if the irregular earth currents were the direct use of the magnetic changes.

(d) Changes in earth currents, those in terrestrial magnetism, as well s those in polar lights, show a definite tendency to recur after a period f about 27 days, which is about the interval for the reappearance of a sun-ot on the earthward side of the sun.

(e) The variations in earth currents change from year to year in a manner ery similar to that of the magnetic variations, and both of these increase r decrease on the average as the sunspot numbers increase or decrease.

(f) Those observations which have been taken to indicate that electric urrents flow predominantly from the base to the summit of mountains can robably be explained as due to a systematic change with altitude in the con-titution of the soil solutions in mountainous regions, which may give rise o a flow of current only when the electrodes and external conductor which re used in the measurements are introduced.--Author's abstract.

(1375) MESURES DE LA RÉSISTIVITÉ DE LA TERRE ET LEUR APPLICATION À LA GÉOPHYSIQUE ET AUX PROBLÈMES TECHNIQUES

(MEASUREMENTS OF THE RESISTIVITY OF THE EARTH AND THEIR APPLICATION TO GEOPHYSICS AND TO TECHNICAL PROBLEMS)

By W. J. Rooney

Prepared for the International Electrical Congress, Paris, July, 1932,
Section 11, Communication No. 4-C-1, 16 pp.

A method and apparatus for the precise determination of the resistivity f undisturbed volumes of the earth's crust with linear dimensions ranging rom 1 to 600 meters or more have been developed at the Department of Terres-rial Magnetism of the Carnegie Institution of Washington. The method is an daptation of that proposed by Wenner in 1915, based on the laws of the 4-erminal conductor. With four electrodes equally spaced in a straight line measured current is passed between the outside pair, and the resulting otential between the intermediate pair is determined. The volume of earth ncluded in a given measurement has linear dimensions approximately equal to he electrode spacing and is varied by changing the spacing. Hence the ariation of recorded resistivity with depth can be determined.

The applied current is reversed periodically to minimize polarization nd eliminate extraneous currents. Important features of apparatus design re:

(1) Provision insuring that the potentials measured are always those corresponding to a steady state of the current and so making the method

essentially a direct-current one; and (2) a guard ring eliminating the possibility of error due to leakage from the current to the potential circuit. Recorded resistivities represent average or "effective" values, in which materials closest to the line of measurement have the greatest effect. The error of measurement is not over one half of 1/2 percent. Values as low as 20 ohm-cm and as high as 5,000,000 ohm-cm have been measured successfully.

Four extensive surveys to determine the resistivity of regions near existing systems for recording earth-current potentials in Australia, Peru, Spain, and the United States, and its variation with position and depth, have been carried out. The results combined with potential records permit evaluation of the latter in terms of current density, make records obtained at widely separated locations directly comparable, and afford an explanation of apparent discrepancies in earlier earth-potential records. Measurements of resistivity made throughout the year have eliminated variations in ground conductivity as a possible cause of the large seasonal variations in the activity of earth currents shown by potential records everywhere. Resistivity data are also useful in the selection of sites for the electrodes of potential-measuring systems.

A study of the variations of resistivity with depth shows that certain concealed structural features, such as the distribution of materials, depth of water table, and the contour and type of bedrock, may, under favorable conditions, be determined from such measurements. The favorable conditions required are a not too complex structure and a sufficient difference in the specific resistance of the materials comprising it. The value of a rapid method of determining these facts to the geologist, the engineer, or the prospector is apparent, and the method or modifications of it have been used for this purpose by a number of investigators.--Author's abstract.

(1376) ÜBER DIE ANWENDUNG DER ELEKTROMAGNETISCHEN WELLEN ZUR BODENFORSCHUNG IN DER U.S.S.R.

(ON THE APPLICATION OF ELECTROMAGNETIC WAVES FOR THE INVESTIGATION OF THE GROUND IN THE U.S.S.R.)

By A. Petrowsky

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 3, No. 2, 1933, pp. 149-204.

A brief historical outline of the development of the ondometry in the U.S.S.R. is given in the introduction.

The apparatus and its gradual improvement is described; the description is illustrated by schematical designs and photographs. After a brief discussion on the theory of radiation of electromagnetic waves in a semiconductive medium the author examines its application for the calculation of the range attainable by the ondometric arrangement. A description of the tests carried ut by the author and his collaborators in the region of Iletzk salt deposits, s well as in Transcaucasia and in the Urals is given. The theory of measure- ents of mean coefficients of absorption and of mean lengths of waves under atural conditions of the layers is discussed; the calculation of the coefficient of absorption in the quartz porphyries resulted in the value $A \simeq 0.1$ m^{-1}, nd that of the length of the wave in serpentine in the value $\lambda \simeq 12$ m. at $_o = 60$ m.

The importance of introducing the conception of direct and indirect waves or the solution of questions concerning radio transmission on the surface of he earth is emphasized and tests confirming this conception are described. onceptions of equivalent media and equivalent electrical constants ρ and ε re introduced and a method for the determination of these constants, as well s a few numerical examples for their interpretation from the obtained results f observation are given.

Finally a list of Russian articles on ondometry is added.--Author's bstract translated by W. Ayvazoglou.

(1377) ELEKTRISCHE TIEFENMESSUNGEN IM THÜRINGER MUSCHELKALK

(ELECTRICAL DEPTH MEASUREMENTS IN THE THURINGIAN SHELL-LIMESTONE)

By Arthur Ebert

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik,
Leipzig, vol. 3, No. 2, 1933, pp. 259-260.

Determinations of depths of various limestone layers and marl layers, own to the variegated sandstone, carried out from the upper shell-limestone n the vicinity of Jena are described.

The error in measurement did not exceed the theoretical limits.-- . Ayvazoglou.

5. RADIOACTIVE METHODS

1378) RADIOAKTIVE GESTEINSUNTERSUCHUNGEN MIT DEM GEIGER-MÜLLERSCHEN ZÄHLROHR

(RADIOACTIVE INVESTIGATIONS OF ROCKS BY MEANS OF GEIGER-MÜLLER COUNTER-TUBE)

By W. Vogt

Physikalische Zeitschrift, Leipzig, vol. 34, No. 2, 1933, pp. 79-82.

A method for investigating the radioactivity of rocks by means of the eiger-Müller counter tube is described.

The mean error obtained from a series measurement during a period of 5 hours was equal to 2.5 x 10^{-13} gram of radium in 1 gram of rock; that is, the error can be accepted for rocks found ordinarily. The method, if compared with the generally used emanation method, has the advantage of greater simplicity.

An automatic counting mechanism with a minimum amplification (an amplifying tube with 3 mA anode current) is described, and some experience on the work with the Geiger-Müller electron counter tube is given.--Author's abstract translated by W. Ayvazoglou.

(1379) THE RADON CONTENT OF SOIL GAS

By Holbrook J. Botset

The Physical Review, Minneapolis, vol. 40, No. 6, 1932, p. 1027.

This paper was presented at the 177th regular meeting of the American Physical Society held in Washington, D. C., on April 28-30, 1932. The abstract of the paper published in the number of the Physical Review mentioned above, reads as follows:

> An electroscope and apparatus for sampling and measuring the radon content of soil gas are described. A study of the radon content of soil gases under varying conditions and over extensive areas gave the following results: There is apparently no correlation between radon content and depth from which the gas sample is taken; radon content during rainy weather appears to be higher than in dry weather; certain soil formations appear to have more or less characteristic radon contents. There is a great local variation in the radon content of soil gas. Measurement of the radon content over a known salt dome showed a definite increase in radon content along the edge of the dome. This was an eroded structure and soil along its edge was enriched in heavy mineral. A determination of the heavy mineral content of the soil showed a definite correlation with the radon content of the soil gas, whence it was found that this is an indirect qualitative measure of the heavy mineral content of the soil.

(1380) INVESTIGATION OF THE PROPAGATION AND ABSORPTION OF COSMIC RAYS IN THE AIR, WATER AND STEEL (IN RUSSIAN)

By A. B. Verigo

Bulletin de l'Observatoire Géophysique Central, Leningrad, No. 3-4, 1931.

Results of investigations carried out by the author with regard to the determination of the values of the intensity of cosmic rays at different altitudes (3,300, 3,525, 4,200, and 5,400 meters above sea level), different depths under water, and below the steel armor of a man-of-war are discussed. The measurements were made by the Kohlhörster electroscope. Summarized data are shown in five tables.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1381) ERDÖL UND GEOPHYSIK

(OIL AND GEOPHYSICS)

By Heinrich Löwy

Kali, Halle (Saale), vol. 26, No. 21, 1933, pp. 265-266.

The author refers to the results of his work on prospecting for oil which, in his opinion, should be mentioned by O. Barsch in connection with his paper delivered at the Petroleum meeting in Hanover (see Geophys. Abs. 48).--W. Ayvazoglou.

(1382) ENGINEERS' DISCUSSION DETAILS CONDITIONS IN EUROPE AND ASIA

Editorial note

The Oil Weekly, Houston, vol. 68, No. 11, 1933, pp. 11-16.

In discussing the conditions of geophysical prospecting in Germany, Walter Kauenhowen noted that more than 10 new salt domes with depths up to 3,280 feet were reported to be found during 1932 by seismic and gravitational methods in the North German Plain. Extensive torsion-balance surveys were made during 1932 in the Northern Plains to discover new salt domes. In the Danube Basin torsion-balance work has been done to discover anticlinal folds. Magnetic surveys were made in the Thuringia and Danube basins to locate regional features of the basement rocks. Electrical investigations have been carried out in the salt-dome and Thuringian territory to solve local problems. --W. Ayvazoglou.

(1383) NOTE SUR LA DÉTERMINATION DU SENS DE CIRCULATION DES EAUX D'UNE NAPPE OCÉANIQUE

(A NOTE CONCERNING THE DETERMINATION OF THE DIRECTION OF THE MOVEMENT OF AN OCEANIC WATER SHEET)

By D. Chahnazaroff

Bulletin de l'Institut Océanographique, Monaco, No. 614, February 20, 1933, pp. 1-16.

The present work may serve as an example of the application of geophysics to various scientific domains. In the first part the author discusses the causes of the changes in the composition of oceanic waters; then he examines the possibility of indicating the nature of the sea water by measuring its physical properties. By measuring the specific gravity and temperature of oceanic waters, at least at three points, and by using a special graph, the author determines the micro and brady circulation of oceanic waters in a given layer; in the last part graphical description of micro and brady circulation of Atlantic Ocean waters is given as an example.--Author's abstract translated by W. Ayvazoglou.

(1384) KURZER ÜBERBLICK ÜBER DIE PHYSIK DER HOHEN ATMOSPHÄRE

(GENERAL VIEW ON THE PHYSICS OF HIGH ATMOSPHERE)

By J. Bartels

Zeitschrift der technischen Physik, Leipzig, vol. 13, No. 12, 1932, pp. 611-616.

Phenomena from which determinations on the physical conditions in the high atmosphere can be drawn are discussed.

The value of the permanent earthmagnetic registrations, especially with regard to the investigation of the influence of the sun, is emphasized.--W. Ayvazoglou.

(1385) GEOPHYSICISTS DEBATE IN THEIR OWN PECULIAR LANGUAGE

By Sherwin F. Kelly

Mining and Metallurgy, New York, vol. 14, No. 315, 1933, pp. 141-142.

In this article Kelly reviews briefly a series of articles on geophysics presented at the annual meeting in New York of the American Institute of Mining and Metallurgical Engineers held in February, 1933.

At the end of the meeting a committee was appointed to look into the matter of expressing resistivity in an acceptable and uniform manner, as well as into the question of nomenclature in gravitational work.--W. Ayvazoglou.

(1386) IST DAS WÜNSCHELRUTENPROBLEM DURCH DIE UNTERSUCHUNGEN VON G. LEHMANN GEKLÄRT?

(DOES THE DIVINING-ROD PROBLEM BECOME CLEAR AFTER THE INVESTIGATIONS CARRIED OUT BY G. LEHMANN?)

By H. Reich

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 3, No. 2, 1933, pp. 219-229.

In his dissertation (Dresden, 1932), Dr. G. Lehmann made an attempt to prove that places where lightning may strike high-tension electric lines are related to the underground watercourses; thus, the latter may be found by ing the divining rod, this being due to the influence of good conductivity watercourses upon the lightning. Above these courses the potential gradient minishes but the conductivity of the air increases. This phenomenon is used Lehmann for checking the effects of divining-rod researches.

Criticizing the results thus obtained, the author of this article formu-tes his objections as follows:

1. Underground water currents do not exist in the region in question.

2. The relation between the reaction of the divining rod and the under-ound water current has not been confirmed by drill holes.

3. The observations made with reference to the aerial electricity are not fficient to prove the problem of underground currents in this region and the oblem of the divining-rod researches.

4. The relation between the divining-rod indications of underground water the one hand and the electrical field on the other hand has not been proved.

5. Technical measures necessary for protection against thunderstorm ngers could be carried out without the use of the divining rod.--Author's stract.

9. NEW BOOKS

1387) Fleming, John A. Annual report of the Director of the Department of of Terrestrial Magnetism, Carnegie Institution of Washington. Reprinted from Year Book No. 31, for the year 1931-1932, issued December 9, 1932, pp. 223-277. Contents: (1) General summary. (2) Investigational and experimental work: (a) terrestrial magnetism and electricity and cosmic relations; (b) magnetism and atomic physics; (c) experimental work in terrestrial electricity. (3) Field work and reductions: (a) Land magnetic survey; (b) observatory work; (c) oceanographic reductions; (d) instrument-shop, and (d) miscellaneous activities. (4) Abstracts of publications, lectures, and progress reports. (5) Personnel.

1388) Glennie, E. A. Gravity anomalies and the structure of the earth's crust. Professional paper 27, Survey of India, Geodetic Branch Office, Dehra Dun, 1932, 35 pp., 4 figs., VII charts. Price 2s. 6d.

1389) Lewis, Robert S. Elements of Mining. John Wiley & Sons, Inc., New York, 1933, 510 pp.; Chapman and Hall, Ltd., London, Chapter 2, pp. 22-48, deals with "Prospecting." Geophysical methods are discussed under the headings: (1) General; (2) magnetic method; (3) gravitational method; (4) seismic method; (5) self-potential method; (6) earth-resistivity methods; (7) parallel-wire method; (8) electrode method; and (9) electromagnetic methods. A brief outline of these methods is given.

(1390) Maurain, Ch., with C. E. Brazier, L. Eblé, H. Larouste, and Ed. Salles. Tables annuelles de constantes et données numériques (Annual tables of constants and numerical data). Gauthier-Villars et Cie., Paris, and McGraw-Hill Book Co., Inc., New York, 1932. Contents: Geophysics: (1) Density of the earth, gravitation, composition; (2) seismology; (3) terrestrial magnetism, earth currents; (4) atmospheric electricity; (5) aurora borealis; (6) radioactivity; (7) solar, atmospheric and terrestrial radiations; (8) meteorology.

(1391) Schonland, B. F. J. Atmospheric electricity. Methuen's Monographs on Physical Subjects, London, 1932, 100 pp., 25 diagrams; price, 2 s. 6 d. net. The book has four chapters devoted to the ionization of the lower atmosphere, the penetrating radiation, electric fields and currents in the atmosphere, and the electrification of thunderstorms.

(1392) Tams, E. Grundzüge der physikalischen Verhältnisse der festen Erde, Erster Teil (Fundamentals of the physical relations of the solid earth, Part 1). Gebrüder Bornträger, Berlin, pp. 184, illus. R.m. 14. This volume is one of the series on the geology of the earth being prepared under the editorship of Prof. E. Krenkel of Leipzig. It discusses (1) the size and shape of the earth and the horizontal and vertical distribution of its surface features; (2) the constitution of the earth as a whole; (3) the constitution of the outer portion of the earth; (4) thermal relations of the earth and its age; (5) gravity distribution upon the earth and the mass arrangement of its outer part.

10. PATENTS

(1393) ELECTRICAL PROSPECTING APPARATUS

Theodor Zuschlag, of New York, N. Y., assignor to Swedish American Prospecting Corporation, of New York, N. Y., a corporation of New York

United States patent 1,884,496 Patent issued October 25, 1932.

The present invention concerns the provision of an improved form of alternating-current prospecting apparatus wherein the exciter and search circuits are incorporated with a compensating or interconnecting circuit in such manner as to permit the determination of the amplitude of the E.M.F. induced by a ground field as well as the phase relation of the ground field to the exciter field. Such improved apparatus may be used in either potential or electromagnetic investigations and includes suitable means for determining the magnitude and phase relation of the investigated ground field on the basis of the exciter circuit current.

Claims allowed - 5.

(1394) METHOD OF AND APPARATUS FOR ELECTRIC EARTH EXPLORATION

Richard Ambronn, of Göttingen, Germany

nited States patent 1,897,688 Patent issued February 14, 1933.

The invention concerns the method of electric earth exploration which omprises generating an alternating current within the range of very low requencies that has a minimum value equal to the maximum frequency of natural arth currents and has a maximum value equal to the minimum frequency effect- ve to produce elliptical polarization, transmitting said alternating current f very low frequency into the earth by means of a circuit comprising elec- rodes embedded in the ground at two spaced points, and observing the effect f said current in the earth by means of an electrical measuring instrument uned to the low frequency of said current.

Claims allowed - 6.

(1395) BALANCE FOR THE MEASUREMENT OF MAGNETIC INTENSITIES

Dr. Erwin Roux and Askania-Werke A.G. Centralwerkstatt Dessau und
Carl Bamberg Friedenau, all of Berlin-Friedenau, Germany.

ritish patent 343,050 Patent issued February 12, 1931.

This invention relates to a magnetic balance for the measurement of agnetic intensity, forming the casing of two parts, one of which can be eadily moved relative to the other to open the interior of the casing, such asing being combined with a pair of balance systems adapted to be supported electively by a knife-edge pivot on a common point of pivotal support with- n the casing, one of said balance systems having a vertical equilibrium osition of balance and the other a horizontal equilibrium position of alance, the combination permitting both horizontal and vertical components o be measured on one instrument.

Claims allowed - 9.

(1396) IMPROVEMENTS IN OR RELATING TO APPARATUS FOR THE COMPLETE DETERMINATION OF THE DIRECTION AND STRENGTH OF MAGNETIC FIELDS IN PARTICULAR OF THE NATURAL MAGNETIC FIELD OF THE EARTH

Dr. Richard Ambronn of Göttingen, Germany

ritish Patent 344,465 Patent issued February 26, 1931.

This invention relates to the apparatus for the complete determination f the elements of a magnetic field, in particular of the magnetic field f the earth, by means of a magnetic balance beam with horizontal axis, haracterized in that the magnetic balance beam is mounted so as to be odily adjustable at will with relation to a circular scale to an arbitrary azimuthal position about a vertical axis, means being provided to measure the inclination of the beam at a plurality of--at least three-adjustment positions about the vertical axis.

Claims allowed - 10.

(1397) IMPROVEMENTS IN OR RELATING TO MAGNETIC BALANCES

Askania-Werke Aktiengesellschaft vormals Centralwerkstatt Dessau und
Carl Bamberg Friedenau of Berlin-Friedenau, Germany.

British patent 369,053 Patent issued March 17, 1932.

This invention relates to a balance system for magnetic balances comprising magnet blades and a central body to which the blades are secured, characterized in that the central body and the blades are made of material having substantially the same coefficient of expansion. A further feature of the invention resides in the provision of compensating means on each side of the axis of rotation of the system for producing oppositely directed turning moments about the axis, the relative magnitudes of the turning moments being variable with temperature variations and also being adjustable independently of the temperature and of each other.

Claims allowed - 12.

(1398) PENDULE DESTINÉ À DES MESURES DE GRAVITÉ

(PENDULUM DESIGNATED FOR GRAVITY MEASUREMENTS)

Société Carl Zeiss of Germany

French patent 732,896 Patent issued September 27, 1932.

This invention relates to a pendulum provided with special adjusting or regulating screws. The axes of the screws are in a position parallel to the axis of suspension of the pendulum. The desired adjustment is obtained by the selection of the lengths of the screws.

Claims allowed - 2.

(1399) PROCÉDÉ ET APPAREIL POUR LA RECHERCHE DES MINERALS, DES SOURCES ET AUTRES APPLICATIONS SIMILAIRES

(METHOD AND APPARATUS FOR PROSPECTING FOR MINERALS, SOURCES OF WATER AND FOR OTHER SIMILAR APPLICATIONS)

Victor Rosset of France (Savoy)

French patent 734,234 Patent issued October 18, 1932.

This invention relates to the method of prospecting for subterranean waters, minerals, etc., by means of a magnetic needle placed inside of a ring magnet, the latter producing the necessary magnetic field. The existence of water, minerals, etc., is established by the declination of the needle.

Claims allowed - 3.

(1400) DISPOSITIF DE MESURE OU DE CONTROLE DE L'INTENSITÉ DE RADIATIONS

(DEVICE FOR MEASURING AND CONTROLLING THE INTENSITY OF RADIATIONS)

C. H. F. Müller Aktiengesellschaft of Germany

French patent 735,221 Patent issued November 4, 1932.

The device assigned, according to this invention, for measuring and controlling the intensity of radiation consists mainly of an electric circuit by which oscillations of relaxation are produced. This circuit carries a capacity, a circuit provided with a rheostat, by which this capacity is charged, and a discharge circuit; the latter contains a circuit of electrical discharge and a conductor, the resistance of which decreases under the action of the utilized radiation.

Claims allowed - 1.

(1401) DISPOSITIF ELÉCTROMAGNETIQUE POUR LA RECHERCHE DES EAUX SOUTERRAINES

(AN ELECTROMAGNETIC DEVICE FOR THE SEARCH OF UNDERGROUND WATERS)

Emmanuel Laugier of France

French patent 735,454 Patent issued November 9, 1932.

This invention refers to a portable device with the aid of which the existence of subterranean waters can be determined in coordination with the natural aptitude of the operator. The device contains an electrical source of energy (battery, induction coil, etc.) inclosed in a holder; the latter is surmounted by two receptacles, one abovethe other. The lower receptacle contains a magnet the magnetic field of which acts upon the upper receptacle, movable about the lower one. Two graduation scales and an index serve for reading and comparing the grades, based on which the determinations are made.

Claims allowed - 1.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director
- - - - -
GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1402) ÜBER DIE FORMELN VON VENING-MEINESZ, CALLANDREAU UND EINIGE ANDERE FORMELN DER HÖHEREN GEODÄSIE

(ON THE FORMULAS DERIVED BY VENING-MEINESZ, CALLANDREAU AND ON SOME OTHER FORMULAS OF HIGHER GEODESY)

By N. Malkin

Gerlands Beitrage zur Geophysik, Leipzig, vol. 38, no. 1, 1933, pp. 53-63.

Mathematical discussion is given under the following headings:

1. Vening-Meinesz' formula and formulas for the second derivative of the potential.

2. Determination of the force of gravity according to the deviations of the plumb line established on the geoid.

3. Determination of the mean radius of curvature of the geoid from gravity anomalies.

4. Determination of the figure of the geoid from the deviations of the plumb line.--W. Ayvazoglou.

(1403) ETUDE D' UN PENDULE ÉLASTIQUE SENSIBLE. CONTRIBUTION A L' ÉTABLISSEMENT DU RÉSEAU GRAVIMÉTRIQUE FRANÇAIS

(STUDY CONCERNING AN ELASTIC SENSITIVE PENDULUM. CONTRIBUTION TO THE ESTABLISHMENT OF THE GRAVIMETRIC NET IN FRANCE)

By F. Holweck

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 1, 1933, pp. 44-46.

The construction of this pendulum was completed in July 1932. The data concerning the sensitiveness and the constants of the apparatus are given. The reliability of the instrument with regard to time and transportation was tested. A journey of 1,500 km. by railroads and more than 7,000 km. by automobile did not have any influence on the constants of the instrument.

A table showing the values g of the gravity measured at different places is added.--W. Ayvazoglou.

(1404) ÉTABLISSEMENT DE LA CARTE GRAVIMÉTRIQUE DU NORD DE LA FRANCE

(DRAWING OF A GRAVIMETRIC MAP OF NORTHERN FRANCE)

By P. Lejay

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196,
no. 1, 1933, pp. 46-49.

In this article Lejay gives the results of his measurements of gravity by the Holweck-Lejay gravimeter no. 42. Measurements carried out at 40 places were made during two months. The instrument did not suffer any changes after being transported over 7,000 km.

A list of places of observation is given, and the results of measurements are summed up in a map.--W. Ayvazoglou.

(1405) EIN NEUER SCHWINGUNGSMESSER

(A NEW VIBRATION INDICATOR)

By G. Fanselau

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 93-98.

A device for measuring the duration of the periods of oscillation is described. The device is especially applicable for the purpose of magnetic measurements (does not contain any iron parts), but in the first place for the pendulum measurements, as by using this device the time necessary for making a measurement can be considerably reduced.--W. Ayvazoglou.

(1406) DIE SCHWERKRAFT AUF DEM MEERE

(GRAVITY ON THE SEA)

By F. A. Vening Meinesz

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 75-76.

The results of gravity observations carried out at 270 stations in the East Indies are briefly mentioned in this article. Details of the gravity investigation on the sea will be published in the Gerlands Beiträge zur Geophysik.--W. Ayvazoglou.

(1407) BERICHT ÜBER DEN GEGENWÄRTIGEN STAND DER ENTWICKLUNG DES STATISCHEN SCHWEREMESSERS

(REPORT ON THE PRESENT-TIME STATE IN THE DEVELOPMENT OF THE STATICAL APPARATUS FOR GRAVITY MEASUREMENTS)

By H. Haalck

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 81-82.

Referring to his previous articles concerning the improvements made in the statical apparatus for gravity measurements (see Geophys. Abs. 38 and 42, pp. 466 and 599) by which the accuracy of measurements attained was equal to ± 10 milligal, the author mentions that based on his continuous tests, in addition to the temperature influence, the source of errors in measurements could be traced also to the irregularity of the coming to rest of the menisci, that is, to the reading device. Improvements made by the author resulted in the fact that the accuracy of measurements obtained in the field was equal to ± 4.5 milligal.--W. Ayvazoglou.

(1408) DIE GENAUIGKEIT VON PENDELKONTAKTEN UND DER EINFLUSS DES STEIGRADES EINER PENDELUHR AUF DIE SCHWINGUNGSDAUER DES PENDELS

(THE PRECISION OF PENDULUM CONTACTS AND THE INFLUENCE OF THE BALANCE-WHEEL OF A PENDULUM CLOCK ON THE PERIOD OF OSCILLATION OF THE PENDULUM)

By H. Martin

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 83-87.

A method is examined by which it is possible to measure periodical motions with an accuracy of several millionths of 1 second. The application of the method is shown on a few examples.--Author's abstract translated by W. Ayvazoglou.

MAGNETIC METHODS

(1409) ZU DER BESTIMMUNG DES MAGNETISCHEN ERDFELDES IN FRÜHERER ZEIT AUS DER MAGNETISIERUNG VON GEBRANNTEN TONGEGENSTÄNDEN UND VON GESTEINEN

(ON THE DETERMINATION OF THE MAGNETIC EARTH FIELD IN ANCIENT TIMES FROM THE MAGNETIZATION OF BAKED CLAY WARES AND ROCKS)

2. MAGNETIC METHODS

(1409) ZU DER BESTIMMUNG DES MAGNETISCHEN ERDFELDES IN FRÜHERER ZEIT AUS DER MAGNETISIERUNG VON GEBRANNTEN TONGEGENSTÄNDEN UND VON GESTEINEN

ON THE DETERMINATION OF THE MAGNETIC EARTH FIELD IN ANCIENT TIMES FROM THE MAGNETIZATION OF BAKED CLAY WARES AND ROCKS)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, no. 1, 1933, pp. 47-52.

In this article Koenigsberger continues his investigations on the etermination of the magnetic earth field in ancient times based on the esidual magnetism of baked clay wares and rocks. A list of the literature amined is added.--W. Ayvazoglou.

(1410) RECHERCHES SUR L'ANOMALIE MAGNÉTIQUE AU SOMMET DU PUY DE DÔME

(INVESTIGATIONS CONCERNING THE MAGNETIC ANOMALY ON THE SUMMIT OF THE PUY DE DÔME)

By J. Coulomb

Comptes Rendus de l'Académie des Sciences, Paris, vol. 195, no. 26, 1932, pp. 1409-1410.

The greatest magnetic anomaly in France is that of Puy de Dôme. It was iscovered in 1902 by Brunhes and David. Brunhes was of the opinion that his anomaly was caused by the residual magnetism of the domite, contrary o the generally applied theory of induced magnetism. Investigations carried ut since that time do not allow the author to give a correct interpretation f the cause of the anomaly.--W. Ayvazoglou.

(1411) ÉTABLISSEMENT DE LA CARTE DES ANOMALIES DE LA COMPOSANTE VERTICALE DU CHAMP MAGNÉTIQUE TERRESTRE DANS LA PLAINE D'ALSACE

(DRAWING OF A MAP OF ANOMALIES OF THE VERTICAL COMPONENT OF THE TERRESTRIAL MAGNETIC FIELD IN THE PLAIN OF ALSACE)

By C. L. Alexanian

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 6, 1933, pp. 420-423.

Alexanian describes the results of his measurements carried out with aalck's variometer no. 36 during 1931 in the plain of Alsace, between the ities of Haguenau and Mulhouse. Distance between the stations of observation varied from 2 to 4 km.; 374 stations were investigated, 147 of them two and three times. A map showing the Z-anomalies is added. A brief interpretation of the results of observation in connection with geology is given as follows:

(1) Perfect continuity of the anomaly curves; (2) a constant SSW.-NNE. direction corresponding to that of Hercynian underground faults extending from the Vosges towards the Forêt Noire; (3) a strong disturbance of circular form caused by the basaltic massif of the Tertiary period near Kaiserstuhl; (4) continuation of the deep volcanic mass of Kaiserstuhl toward the basaltic point of Riquewihr at the foot of the Vosges; (5) the existence of similar basaltic points dissimulated under the alluvial overburden of the plain; (6) on the south of the plain the Hercynian direction reappeared. A maximum oriented in this direction marked the Southeast limit of the potassium basin. --W. Ayvazoglou.

(1412) THE BEARING OF THE EARTH'S INTERNAL MAGNETIC PERMEABILITY UPON THE SELF - AND MUTUAL INDUCTANCE OF COILS WOUND ON ITS SURFACE

By W. F. G. Swann

The Physical Review, Minneapolis, vol. 41, no. 5, 1932, pp. 649-666.

The paper comprises the solution of the following problems: (1) The mutual induction of two parallel circular loops wound as small circles upon the earth in such a manner that their distance apart is equal to their radius. The mutual induction varies from 2.8 henries for a permeability unity to 11 henries for infinite permeability. (2) The self-induction of a circular loop wound as a small circle upon the earth and of radius equal to half that of the earth. The self-induction varies from 79.8 henries for unit permeability to 167 henries for infinite permeability. (3) A solution is given for the self-induction of a single circular coil situated parallel to and at a distance h above an infinite medium of permeability, μ. Data are given, showing the magnitude of the effect of the permeability for different distances of the coil from the plane. (4) The mutual induction of the coils considered in problem (1), and the self-induction for the coil considered in problem (2), are calculated for a case where the permeability of the earth varies from unity at its surface to infinity at the center. A fairly general formula, applicable to different degrees of rapidity of variation is developed for this purpose. The content of this problem will be most readily ascertained by immediate reference to table IV, which is self-explanatory.

Table IV.- Mutual induction M of the two parallel circular loops wound around the earth of radius a, for the cases where μ varies with the distance r from the center according to the law $\mu = (a/r)^m$ also self-induction of a single loop.

m	Value of a/r for $\mu = 10$	Mutual inductance (henries)	Self-inductance (henries)
3	2.15	6.76	85.6
2	3.16	5.53	83.7
1	10.00	4.13	81.7_3
0	-	2.82^3	79.8

--Author's abstract.

(1413) MESURES MAGNÉTIQUES ET CARTE MAGNETIQUE DES ISOGONES DE LA MOLDAVIE ET BESSARABIE (ROUMANIE)

(MAGNETIC MEASUREMENTS AND MAGNETIC MAP OF ISOGONS OF MOLDAVIA AND BESSARABIA (ROUMANIA)

By St. Procopiu

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 38, no. 1, 1933, pp. 31-35.

The results of magnetic measurements carried out in Moldavia and Bessarabia in 1931 and 1932 are shown in tables. Magnetic declination is given in a map.--W. Ayvazoglou.

(1414) ZUR PHYSIKALISCHEN THEORIE DES ERDMAGNETISMUS

(ON THE PHYSICAL THEORY OF EARTH MAGNETISM)

By T. Schlomka

Zeitschrift fur Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 99-109.

Three kinds of earth-magnetic theories are discussed: The permanent theory, the current theory, and the rotation theory. The permanent theory is not sufficiently convincing; the current theory is unmanageable; thus, in the opinion of the author, the rotation theories only remain by which the physical explanation of the earth-magnetic field can be given. One of these rotation theories is examined by the author in this article. Formulas showing the relationship between the forces of two protons, two electrons, and one proton and one electron are derived. The method by which these formulas can be derived is shown. Possibilities for drawing conclusions and proofs from the developed theory are indicated.--W. Ayvazoglou.

(1415) EINE HOCHEMPFINDLICHE MAGNETISCHE FELDWAAGE

(A MAGNETIC FIELD BALANCE OF HIGH SENSITIVITY)

By J. B. Ostermeier

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 109-118.

The author describes a field balance, the constructive improvements of which were developed during more than 12 years of experimental work. Numerous measurements were made with this balance under various conditions and the average error for single observation was never greater than $\pm 4 \gamma$. The accuracy of the adjustment and of the reading at two points with different vertical intensity and known difference up to 320 γ was tested and it was proved that the mean error of single observations was $\pm 0.7 \gamma$, the sensitivity being 10 γ per scale graduation.

The time necessary for making one observation was, on the average, from 4 to 5 minutes.--W. Ayvazoglou.

3. SEISMIC METHODS

(1416) EINIGE KORRELATIONEN ZWISCHEN SEISMISCHER BODENUNRUHE IN HAMBURG UND DER BRANDUNG IN WEST=UND NORDEUROPA

(SOME CORRELATIONS BETWEEN THE SEISMIC EARTH DISTURBANCE IN HAMBURG AND THE SURF IN WESTERN AND NORTHERN EUROPE)

By E. Tams

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 23-31.

Correlations between the earth disturbance in Hamburg and the surfs at the Scottish-Irish west coast, the Norwegian coast, the coast of Jutland, and the German Baltic Sea coast and the strong seismic oscillations occurring during a period of 22 days (January-February 1932), were calculated.

The surf at the Norwegian coast only was of decisive importance. The relation to the latter was established by the application of the mean daily data, as well as by single observations made at 7^h and 18^h (Greenwich time), to be very close (coefficient of correlation $\geqq 0.8$) to that observed previously during several years, based on the mean values of the data obtained during decades. The correlation was still better after the direction of the wind was taken into consideration. The relation to the vertical component of the earth disturbance was only slightly less distinct than the relation to the horizontal component. Finally, the author examined the suitability of the used numerical characterization of the earth-disturbance and had shown that from the measurements, although not very numerous, the law of the increase of the amplitude with the period could be seen distinctly.--Author's abstract translated by W. Ayvazoglou.

(1417) DAS NORDTIROLER BEBEN VOM 8 OKTOBER 1930. II TEIL

(THE NORTH-TIROL EARTHQUAKE OF OCTOBER 8, 1930. PART II)

By H. Gräfe

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 31-43.

This is the continuation of Gräfe's investigation of this earthquake published in a previous article (see Geophys. Abs. 40, p. 541). The discussion given in the present article concerns the "forces produced in the focus of the earthquake" (Die Kräfte im Herd des Bebens).

The translation of the author's summary reads as follows:

> Based on the dislocations on the surface of the earth the author draws conclusions on the forces produced in the focus of the earthquake. According to these conclusions the cause of the North-Tirol earthquake must be assigned to the shearing forces inclined toward the horizontal produced in the focus.

--W. Ayvazoglou.

(1418) VERSUCHE ÜBER BODEN=UND GEBÄUDESCHWINGUNGEN

(EXPERIMENTS CONCERNING OSCILLATIONS OF THE GROUND AND OF BUILDINGS)

By A. Ramspeck

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 44-59.

The author shows how the amplitude of the oscillation of a building, caused by the oscillation of the ground, can be calculated from the amplitude and period of the latter if the function of the magnification of this building is known.

A simple method of estimating the tensions in a building caused by the oscillation is introduced by the way of experiment, and is examined based on the practical knowledge obtained from the earthquake observations. The article concludes with various methods for the experimental determination of the magnifying function (Vergröserungsfunktion) of the building.--Author's abstract translated by W. Ayvazoglou.

(1419) EARTHQUAKE EFFECTS ON OIL FACILITIES

By George F. Prussing

Union Oil Bulletin, Los Angeles, vol. 14, no. 3, 1933, pp. 2-5.

After a few quotations on the first historical account of earthquakes in California (1769), the author shows the effect of the earthquake of 1933 in the Los Angeles Basin on the oil-storage tanks.

A picture of a field gas meter box located at Huntington Beach, which became a seismograph during the southern California earthquake, is given. The interesting recordings of the meter box during the night of March 10 and the morning of March 11 are graphically indicated on the gas-pressure chart. The box faced east, hence the movements of the penrecorded the north-south earth shocks.--W. Ayvazoglou.

(1420) STUDIES IN REFLECTED SEISMIC WAVES

By L. B. Slichter and V. Gavrilovich Gabriel

Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, no. 1, 1933, pp. 228-256.

The article consists of two parts: Part I, Some computations of the reflection of seismic waves at solid boundaries; Part II, Surface motions due to reflections in a layered crust.

Authors' summary (for parts I and II) reads as follows:

> In the first part of this paper, the reflected and refracted seismic waves are computed at three boundaries, chosen to approximate the transitions which are supposed to occur in the upper crust of the earth. In the second part, the influence of an assumed layered crust in contributing to the oscillatory character of the P and S phases of seismograph records is examined. In many cases the contributions to the surface motion from secondary waves produced by internal reflections in the crust are noteworthy, and tend to produce a motion of irregular oscillatory type.
>
> Of these secondaries, more than a dozen attain significant amplitudes at parts of the epicentral range. The relative amplitudes of their surface motions, and their arrival times, are plotted as functions of epicentral distance.

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In the present article the author develops the theory of the distributio of seismic waves based on the facts obtained by observations and conformable with Boltzman's theory of the elastic aftereffect.

According to this theory, the following conclusions are drawn:

1. The coefficient of absorption of the transversal waves q is equal to

$$q = \frac{\pi^2}{2\,l}\ B,$$

in which l is the length of the wave and B is the constant which is proportional to the elastic aftereffect of the medium.

2. The coefficient of absorption of the longitudinal waves of the same period is about four times smaller.

3. The space waves (Raumwellen) show an anomalous dispersion, which agrees with seismic observations.

4. The observed value of the absorption of the surface waves shows for the uppermost earth's crust the value of the constant of the elastic aftereffect B, which is very close to that of glass; this seems to be very plausibl

5. Short waves are, according to the equation given, absorbed with the increase of the distance more quickly than the long waves; this results in the fact that their form of oscillation changes during their propagation.

Based on the principle of the preservation of the value of the momentum it is proved that the change of the form of an impulse must, owing to the absorption accompanying it, always take place during its propagation independently from the special assumptions on which the theory is based.--Author's abstract translated by W. Ayvazoglou.

4. ELECTRICAL METHODS

(1423) EINIGE BEMERKUNGEN ZÜR ENTWICKLUNG DER SCHWEDISCHEN GEOELEKTRISCHEN METHODEN FUR AUFSUCHUNG VON ERDÖLSTRUKTUREN

(SOME REMARKS CONCERNING THE DEVELOPMENT OF SWEDISH GEOELECTRIC METHODS OF PROSPECTING FOR OIL-BEARING STRUCTURES)

By Otto Meier

Petroleum Zeitschrift, Berlin, vol. 29, no. 10, 1933, pp. 14-16.

Meier refers to his previous work published in the "Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie," vol. 34, no. 14, July 15, 1926, under the title "On electrical prospecting for oil" in which he indicates the importance of this method of prospecting for disclosing underground structures. An electrical profile traced near Zistersdorf is added to that article.

In the present article Meier compares the profile traced about 7 1/2 years ago with the geological profile of the same location, as given by Friedl based on the borings carried out recently (see Petroleum Zeitschrift, vol. 28, no. 48, 1932). An almost complete agreement of geophysical measurements with the results obtained from borings is shown.

The author concludes that owing to the developments made in the Swedish geoelectrical methods of prospecting with regard to determining the depth of an electrically conductive body covered with more than one electrically conductive layer, oil-bearing structures may be determined at the present time with great accuracy and at greater depths.--W. Ayvazoglou.

(1424) DIE BESTIMMUNG DES VERLAUFES GENEIGTER DISKONTINUITÄTSFLÄCHEN (EINFALLENDE SCHICHTGRENZEN UND VERWERFUNGEN) DURCH DAS WIDERSTANDSVERFAHREN

(THE DETERMINATION OF THE COURSE OF THE INCLINED SURFACES OF DISCONTINUITY (FAULTS, DISLOCATIONS) BY THE RESISTIVITY METHOD)

By W. Stern

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 1-11.

It is shown how the method of the apparent specific resistance, which so far was applied for the determination of the vertical series of layers below the point of measurement disclosing indirectly only the course of the borders of the layers with regard to their lateral extension, can be used for the direct determination of this course. The theoretical courses of the corresponding resistance curves are constructed for a series of typical geological cases (outcropping layer borders, faults, flanks, grabens, horsts), and the relationship between them and the structure of the underground is determined. A method of evaluation based on this relationship is given by which (if certain conditions are satisfied) the place of the outcrop of the inclined surface of discontinuity, as well as the direction and the value of its strike, is furnished.--Author's abstract translated by W. Ayvazoglou.

(1425) APPLICATION OF ELECTRICAL PROSPECTING IN OIL-FIELD PRACTICE (IN RUSSIAN)

By A. M. Shaiderov

Neftianoe Khoziaystvo, Moscow, vol. 24, no. 1, 1933, pp. 17-21.

In this article Shaiderov discusses the importance of electrical coring (carrotage) in the field practice of prospecting for oil. The advantages of electrical coring, which at present is introduced in all the Russian oil fields, are described and illustrated by diagrams. The two last paragraphs of the article deal with the measurements of temperatures in boreholes and with measurements of the deviation of boreholes from the vertical. The principle of Schlumberger's apparatus for measuring the magnitude and the azimuth of the deviation is briefly described. According to the author, a detailed diagram showing the deviation of the axis of a deep well from the vertical, with intervals of 20 meters, can be obtained in about 3 hours.--W. Ayvazoglou.

(1426) SOURCES OF ERRORS IN THE DETERMINATION OF THE POTENTIAL GRADIENT OF THE EARTH'S ELECTRIC FIELD

By A. C. McNish

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 37, no. 4, 1932, pp. 439-446.

Potential-gradient data are likely to be misinterpreted if space-charge distributions are not given appropriate consideration. The magnitude of these effects is investigated for various space-charge conditions. The errors which enter into reduction-factor determinations from this source are calculated, and conditions for reducing this error to a minimum are outlined. Equations are developed for the effect of finite space-charge distributions on the quantity V/h. The equations show that if the horizontal extent of the space-charge layer is several times its thickness, errors introduced by considering its horizontal extent as very great are negligible.--Author's abstract

(1427) COMPOSANTE DIURNE DU GRADIENT DE POTENTIEL ÉLECTRIQUE AU VAL-JOYEUX; VARIATION DE SA PHASE ET DE SON AMPLITUDE

(DIURNAL COMPONENT OF THE GRADIENT OF THE ELECTRICAL POTENTIAL AT VAL-JOYEUX; VARIATION OF ITS PHASE AND OF ITS AMPLITUDE)

By R. Guizonnier

Comptes Rendus de l'Académie des Sciences, Paris, vol. 195, no. 25, 1932, pp. 1299-1301.

Curves are given representing the diurnal component obtained from observations carried out at the Val-Joyeux observatory from 1925 to 1930.--W. Ayvazoglou.

(1428) RELATION ENTRE LES VARIATIONS DIURNES DU COURANT TELLURIQUE ET DU CHAMP MAGNÉTIQUE TERRESTRE

(THE RELATION BETWEEN THE DAILY VARIATIONS OF THE EARTH CURRENT AND THE TERRESTRIAL MAGNETIC FIELD)

By David Stenquist

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 3, 1933, pp. 205-208.

The author used the observations carried out in Sodankyla, the Lund, Paris, Tortosa, and Batavia to draw curves showing the variations ΔN and ΔE of the earth current during calm days.

In a second figure Stenquist gives a curve of arc. tan Δ_N / Δ_E function of the hour.

The terrestrial eddy current and the magnetic whirls are represented a third figure.--W. Ayvazoglou.

(1429) APPARENT VERTICAL EARTH-CURRENT VARIATIONS AT THE HUANCAYO MAGNETIC OBSERVATORY

By S. E. Forbush

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 38, no. 1, 1933, pp. 1-11.

Continuous photographic registration at the Huancayo Magnetic Observatory, n Peru, of the potential difference between electrodes at the top and bottom f a dry well about 46 meters deep indicated apparent changes in the vertical arth-potential gradient. Comparatively short time-changes, during magnetic isturbances, occurred simultaneously on the magnetic horizontal-intensity ecord, on the horizontal earth-current records, and on the record of the otential difference between the electrodes in the well. For changes occurring n intervals of about 10 minutes or less, an increase of current toward the orthwest in the horizontal plane was always associated with an increase of urrent downward in the well; similarly an increase toward the southeast was lways associated with an increase upward in the well. For all the changes nvestigated the increase of current in the horizontal plane was always approximately toward the northwest or toward the southeast. It is concluded that at his station the distortion of the normal horizontal earth current lines of low by horizontal and vertical variations of resistivity near the well may be he sole source of the observed variations in the vertical direction and that he apparent vertical earth current probably does not cross the earth's urface.--Author's abstract.

(1430) VARIATIONS IN THE ELECTRIC FIELD IN THE ATMOSPHERE MEASURED IN JOHANNESBURG, SOUTH AFRICA, DURING 1929 AND 1930

By E. C. Halliday

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 38, no. 1, 1933, pp. 37-53.

A description is given of the construction of an electrograph recording hotographically and of the setting up of an installation to obtain continuous records of the absolute value of the potential gradient above the surface of he earth. Using this apparatus, continuous records were made over a period f 22 months, and a statistical survey of the data obtained is given. The xistence of a maximum of potential gradient in midsummer as well as in winter s demonstrated. This and other minor phenomena are considered to be due to the effects of a variation in the relative distribution of wind directions during the year, and in some months during the course of the day. The argument is based upon the publications of Chree, Whipple, and Wait, on the influence of pollution and the concentration of condensation nuclei on the atmospheric potential gradient.--Author's abstract.

5. RADIOACTIVE METHODS

(1431) QUANTITATIVE BESTIMMUNGEN DES LUFTGEHALTES AN RADIUM-THORIUMEMANATION MITTELS EINER NEUEN ELEKTRISCHEN AUSSTRÖMUNGSMETHODE

(QUANTITATIVE DETERMINATIONS OF THE AIR CONCERNING ITS CONTENT OF RADIUM-THORIUM EMANATION BY MEANS OF A NEW ELECTRIC EMANATION METHOD)

By Guiseppina Aliverti

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 16-22.

A new method for quantitative measurements of atmospheric radium activity is described. This method, which is based on the properties of electrical emanation found by Sella, renders it possible to make quick determinations by using a comparatively simple arrangement. The results of about 80 measurements carried out in Turin from February to July, 1932, are discussed.--Author's abstract translated by W. Ayvazoglou.

(1432) LA RADIOACTIVIDAD DE LAS AGUAS

(RADIOACTIVITY OF WATERS)

By D. Chahnazaroff

Petroleos y Minas, Buenos-Aires, vol. 13, no. 143, 1933, pp. 6-9.

In this article the author gives a description of the phenomena owing to which waters become radioactive. The method of analysis and the units of the radioactivity by which the accurate geophysical characteristics of underground waters can be established are discussed.--W. Ayvazoglou.

(1433) DEFLECTION OF COSMIC RAYS BY A MAGNETIC FIELD

By L. F. Curtiss

Bureau of Standards Journal of Research, Washington, vol. 9, no. 6, 1932, pp. 815-823.

A continuation of earlier experiments on this subject (Phys. Rev., vol. 34, p. 1931, 1929, and vol. 35, p. 1433, 1930), gives decisive evidence that a considerable fraction of an unfiltered cosmic-ray beam can be deviated by a magnetic field of 7,000 gauss. Using four Geiger-Müller tube counters, coincidences were observed with and without a magnetic field. The arrangement was such that electrons in the beam, possessing energies corresponding to 10^9 volts or less, could be prevented from producing coincidences. Observations were made for a total of 615 hours without the field and 508 hours with the field, in alternating periods of about 48 hours. The average number of coincidences without the magnetic field was found to be 1.31 ± 0.09 per hour and with the magnetic field 0.88 ± 0.14 per hour. This indicates that, for approximately 70 percent of the cosmic-ray particles, the deviation is less than that for 10^9 volt electrons.

This harder portion of the beam may contain, in addition to electrons of higher energy than 10^9 electron volts, protons of 5×10^8 electron volts and neutrons. These data indicate that the results obtained by Rossi (Nature, vol. 128, p. 300, 1931) and of Mott-Smith (Phys. Rev., vol. 37, p. 1001, 1931) showing no effect of the magnetic field, were affected by scattering or absorption in the iron core in which the magnetic field was produced.--Author's abstract.

(1431) A SELF-RECORDING COSMIC-RAY ELECTROMETER AND DEPTH-IONIZATION CURVE

By J. M. Benade

The Physical Review, Minneapolis, vol. 42, no. 2, 1932, pp. 290-297.

A self-contained automatic recording electrometer connected to a collecting rod in a thin steel-walled ionization chamber was used to measure intensity of cosmic rays at various depths in Konsar Nag, Kashmir. The lake is about 280 feet deep. Its surface is about 11,600 feet above the sea level and its water is practically free from radioactive matter. The electrometer consists of two short parallel phosphor-bronze ribbons attached at one end only. Their divergence is recorded photographically at 8-minute intervals, and at the end of each hour the fibres are automatically recharged. The temperature, depth, and position of the instrument with respect to the vertical, are also recorded along with electrometer deflections. The curve obtained corresponds to those of Millikan and Cameron to a depth of 50 meters but at greater depths it more closely parallels that of Regener. The slopes of these curves at any particular depth seem to depend upon the type of ionization chamber as well as upon the intensity of the cosmic radiation of that depth.--Author's abstract.

7. UNCLASSIFIED METHODS

(1435) BEMERKUNGEN ZU DEM AUFSATZ VON G. SCHMERWITZ: "EINFLUSS DER SCHNEIDENLAGERUNG AUF DIE MESSGENAUIGKEIT GEOPHYSIKALISCHER INSTRUMENTE"

(REMARKS CONCERNING G. SCHMERWITZ' ARTICLE: "INFLUENCE OF THE KNIFE-EDGE BEARING ON THE ACCURACY OF MEASUREMENT OF GEOPHYSICAL INSTRUMENTS")

By M. Schuler

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 60-61.

Schuler makes some remarks concerning the conclusions drawn by Schmerwitz (see Schmerwitz' article, Geophys. Abs. 47, p. 776) in connection with the changes of the knife-edge curvatures caused by the wearing off of the knife-edges.--W. Ayvazoglou.

(1436) GEOPHYSICS FROM THE EUROPEAN VIEWPOINT

By Sherwin F. Kelly

Engineering and Mining Journal, New York, vol. 134, no. 4, 1933, pp. 165-166.

Under this title Kelly gives a review of the following books on geophysics:

1. Traité pratique de prospection géophysique (Practical treatise on geophysical prospecting), by C. L. Alexanian (see Geophys. Abs. 39).

2. Études Géologiques et prospections minières par les Méthodes Géophysiques (Geological and mining studies by geophysical methods), by P. Geoffroy and Charrin (see Geophys. Abs. 42).

3. Directions for the use of the Askania Torsion Balance, by C. A. Heiland (see Geophys. Abs. 44).--W. Ayvazoglou.

(1437) LES EAUX PÉTROLIFÈRES

(THE OIL-BEARING WATERS)

By D. Chahnazaroff

Annales Guérard-Séverine, Neuchatel, no. 8, 1932, pp. 289-293.

Geophysical conditions accompanying the formation of oil have been discussed by the author in several previous papers. In this article the author examines the thermodynamic and biological factors which are closely connected with the conditions of the accumulation of elements from which oil may be formed in future.--Author's abstract translated by W. Ayvazoglou.

(1438) ÜBER DIE NOTWENDIGKEIT EINES GROSSEN BEOBACHTUNGSSTOFFES BEI STATISTISCHEN UNTERSUCHUNGEN

(ON THE NECESSITY OF A LARGE AMOUNT OF OBSERVATION DATA FOR STATISTICAL INVESTIGATIONS)

By Franz Baur

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 11-15.

The author expresses his opposition to the opinion, arisen recently, hat, taking into consideration the fact that in many cases periodicities and orrelations are subjected to considerable secular variations, the statistical nvestigations should be carried out for comparatively short periods of time nly. Statistical investigations are of great importance only if they are ased on a great amount of data of observations. Only in this case the umerical "descriptions" of the natural phenomena can be embodied into physical aws based on problems raised by physics; only in this case it is possible to stablish whether and for what reason these laws depend on secular changes. -Author's abstract translated by W. Ayvazoglou.

(1439) DIE 10 TAGUNG DER DEUTSCHEN GEOPHYSIKALISCHEN GESELLSCHAFT VOM 4 BIS 6 OKTOBER 1932 IN LEIPZIG

(THE TENTH SESSION OF THE GERMAN GEOPHYSICAL SOCIETY HELD FROM 4 TO 6 OCTOBER 1932 IN LEIPZIG)

By A. Nippoldt

Die Naturwissenschaften, Berlin, vol. 20, no. 48, 1932, pp. 873-874.

In this article Nippoldt gives a brief report on the following papers presented at the meeting: (1) On the potential drop and conductivity over water veins as a contribution to the question of the divining rod, by Dr. Lehmann; (2) on the results of Alfred Wegener's Greenland expedition over the inland ice, the Nautilus expedition, Dr. Villingers' gravity measurements, and the Zeppelin polar cruise, presented by Kurt Wegener; (3) Dr. F. A. Vening-Meinesz' submarine cruises for measuring gravity; (4) G. Angenheister's report on the organization and problems of the Seismological Institute in the U.S.S.R.; (5) A. Defant's survey on the anchor stations of the Meteor expedition; (6) Ad. Schmidt's paper on the question: To what extent the earthmagnetic secular variation can be explained by a uniformly rotating magnetized earth nucleus; (7) T. Schlomka's theory of gravity and magnetism; (8) on the new treatment of sound observations in Göttingen, presented by H. Regula; (9) A. Nippoldt's report on German work during the polar year and on the general noise in the atmosphere; (10) A. Karolus -- on a photocell device for sight measurements; (11) H. Schmehl's report on the results of the geodetic and gravimetric measurements, carried out by the Inter-Baltic Commission; (12) K. Jung's opinion on the question concerning the best method of gravity measurements reduction;

(13) Raubald's demonstration of an apparatus for topographic reduction of gravity measurements; (14) on articles concerning seismics presented by H. K. Müller, H. Köhler, H. Jung, and A. Ramspeck. Finally Nippoldt mentions the lectures delivered in connection with questions concerning various instruments.--W. Ayvazoglou.

(1440) LA GEOFISICA AL SERVICIO DE LA INGENIERIA MODERNA

(GEOPHYSICS IN THE SERVICE OF MODERN ENGINEERING)

By Sherwin F. Kelly

Ingenieria International, New York, vol. 21, no. 4, 1933, pp. 116-118.

In this article Kelly indicates the important role of geophysical exploration and the possibility of its application for the solution of various problems.

Magnetic, seismic, and electrical methods are briefly discussed (see also Geophys. Abs. 44, p. 671).--W. Ayvazoglou.

(1441) BERICHT ÜBER DIE DEUTSCHEN GEOMAGNETISCHEN UND GEOELEKTRISCHEN BEOBACHTUNGEN WÄHREND DES INTERNATIONALEN POLARJAHRS 1932/33

(REPORT ON THE GERMAN GEOMAGNETIC AND GEOELECTRIC OBSERVATIONS MADE DURING THE INTERNATIONAL POLAR YEAR 1932/33

By A. Nippoldt

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 1/2, 1933, pp. 90-92.

Germany's cooperation in the polar year observations was confined, owing to the financial difficulties, almost entirely to the home country. In this article the author enumerates the places in which observations on the earth magnetism, earth current, etc., were carried out.--W. Ayvazoglou.

8. GEOLOGY

(1442) L'EAU EST-ELLE LIÉE GÉNÉTIQUEMENT AVEC DU PÉTROLE?

(IS WATER GENETICALLY CONNECTED WITH OIL?)

By D. Chahnazaroff

Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie,
Vienna, vol. 41, no. 7, 1933, pp. 73-77.

In studying the geophysical conditions of the formation of oil emulsions onnected with the period of the formation of oil and subjected to definite ydrodynamic rules, the author comes to the conclusion that oil-water is not simple "associate" taking part in the phenomenon of the formation of oil, ut is a substance the geophysico-chemical role of which is inseparably united ith hydrocarbons.--Author's abstract translated by W. Ayvazoglou.

(1443) THE DEPTHS OF THE EARTH

By Reginald A. Daily

Science, New York, vol. 77, no. 1987, 1933, pp. 95-102.

In this article the content of the address on the "depths of the earth", ead by the author before the Geological Society of America, December 28, 1932, ppears in somewhat abridged form; the illustrations and references are omitted. he lecture will be printed in full in the bulletin of the Geological Society.

Author's conclusion reads as follows:

> We have briefly surveyed an old problem, weighted, as few others are, with fundamental meaning for geology. A problem it will long remain. Cosmogonic theory, seismological results, study of thermal gradients and of isostatic adjustment, like the multitude of facts of tectonics and petrology, all seem to support a thesis: Our planet is still too hot to crystallize at any depth greater than 80 km. or 50 miles. But the support is not proof, nor is any theory of the earth to be absolutely demonstrated. As usual in the leading questions of science, we are pragmatists and search for the theory that works best. The thin-crust theory appears to work best. Yet the chief reason for putting it in the foreground is the fact that it can guide to fruitful reaearch in the future. As never before, the geologist realizes the meaning of the ancient maxim "deep calleth unto deep the need of seeking in the shells and core of the earth explanation for the dramatic changes registered in its relief and visible rocks."

9. NEW BOOKS

(1444) Guttenberg, Dr. B. Handbuch der Geophysik (Handbook of Geophysics). (1) Vol. II, part 2, "The geological structure of the earth," by Prof. A. Born; paper covers, 303 pp., illustrated, price 69 R.M., subscription price 46 R.M. (2) Vol. IV, part 3, "Earthquake geography," by Prof. Dr. A. Sieberg; paper covers, 319 pp., illustrated; price 84 R.M., subscription price 56 R.M. (3) Vol. IX, part 1, "The structure of the atmosphere," by Prof. Dr. B. Gutenberg; paper covers, 171 pp., illustrated; price 36 R.M., subscription price 24 R.M. Berlin: Gebruder Borntraeger.

(1445) Maurain, Ch., Annales de l'Institut de Physique de Globe de l'Universit de Paris et du Bureau Central de magnétisme terrestre. Vol. 10, 1932, 137 pp. Paris, Les Presses Universitaires de France, 49, Boulevard St.-Michel. Contents of the book: (1) Magnetic observations made at the Observatory of Val-Joyeux during 1930, by L. Éblé; (2) magnetic observations made at the Observatory of Val-Joyeux, 1923-1930, by Ch. Maurain, E. Salles, and G. Gibault; (4) on the constants of the Sterneck pendulum apparatus for measuring gravity; (5) résumé of meteorological observations made at the Observatory of Parc Saint-Maur in 1930, by C. E. Brazier; (6) résumé of actinometric observations made at the Observatory of Parc Saint-Maur in 1930, by C. E. Brazier; (7) magnetometric study of the residual and induced magnetization of crude and baked clays, by L. Thellier; (8) statistical investigations concerning the relationship between the solar phenomena and the terrestrial magnetic phenomena; (9) principal magnetic perturbations in 1929.

(1446) Seidlitz, Prof. Dr. W. von. Der Bau der Erde und die Bewegungen ihrer Oberfläche: eine Einführung in die Grundfragen der allgemeinen Geologie. (The structure of the earth and the movements of its crust: an introduction into the fundamental principles of geology). Verständliche Wissenschaft, Berlin, Julius Springer, vol. 17, 1932, 152 pp. Price, 4.80 gold marks. The main part of the book deals with the movements to which the earth's crust has been subjected. The book concludes with a table of geological formations, short bibliography, a glossary, and an index.

(1447) Survey of India. Geodetic Report. Vol. VII, October 1, 1930, to September 30, 1931. Published by the order of Brigadier R. H. Thomas, D.S.O., Surveyor General of India. Printed at the Geodetic Branch Office, Survey of India, Dehra Dun, 1932. 179 pp., 29 charts, and plates. Price, 3 rupees or 5 shillings and threepence. Contents: Chapter I, Computations and publication of data; chapter II, Observatories; chapter III, Tides; chapter IV, Deviation of the vertical; chapter V, Gravity; chapter VI, Triangulation and base measurement; chapter VII, Leveling; chapter VIII, The magnetic survey; chapter IX, The lay-out of geodetic triangulation, and the intervals between base lines and Laplace points. List of publications of the Survey of India.

10. PATENTS

(1448) SEISMIC EXPLORATION OF GEOLOGIC FORMATIONS

Burton McCollum, of Houston, Tex., assignor to McCollum Geological Explorations, Inc., of Houston, Tex., a corporation of Delaware.

nited States patent 1,899,970 Patent issued March 7, 1933.

This invention relates to seismic method of locating subterranean geologic ormations, determining their depth, and profiling their surfaces. The method onsists in originating a plurality of seismic waves above said formation at paced points and at times to enable the individual waves to be reflected from aid formation to arrive simultaneously at a common detecting point, recording he time of origin of each separate wave, and recording the simultaneous rrival of the reflected waves.

Claims allowed - 8.

(1449) METHOD AND APPARATUS FOR SOUND RANGING

Harvey C. Hayes, of Washington, District of Columbia

nited States patent 1,900,015 Patent issued March 7, 1933.

The present invention relates to a device for measuring distance consistng of means for generating one periodic series of sonic signals, means for enerating a second periodic series of sonic signals so spaced in time relaion to the first series that the signals of the second series are generated nly midway between the signals of the first series, means for projecting said irst series of signals to an object, the distance of which it is desired to now, means for receiving the sonic signals reflected from said object and coneying them to a point of audition, means for conveying the second series to he point of audition and means for correspondingly varying the period of the wo series of signals and maintaining said midway relation whereby the echoes f the signals of the first series reach said point of audition at the same ime as the direct signals of the second series.

Claims allowed - 7.

(1450) METHOD OF AND APPARATUS FOR DETERMINING TRUE ROCK TEMPERATURE IN ROTARY DRILLED WELLS

Lewis A. Bond, of Los Angeles, Calif., assignor to Shell Oil Co., of San Francisco, Calif., a corporation of California.

nited States patent 1,901,431 Patent issued March 14, 1933.

This invention relates to a method of determining true rock temperatures n a well, which comprises: (1) Lowering into the lower end of a well a heatensitive element sealed from that portion of the well above said element, and recording the temperature of said element; (2) lowering a heat-sensitive element a distance below the normal bottom of said borehole, and recording the temperature to which said heat-sensitive element is subjected. The device is a combination of a heat-sensitive element in the lower part of a well, sealing means for sealing said heat-sensitive element in a chamber formed by the walls of the lower end of said well, and recording means for recording the temperature in said chamber.

Claims allowed - 3.

(1451) OIL-DETECTING METHOD

The Oil Finding Corporation, New York City, N. Y., assignee by
their attorney of Louis Charles Billotte, Revere, and Edward
Lipson, Chelsea, co-inventors, both in Massachusetts, U.S.A.

Canadian patent 327,865 Patent issued November 22, 1932.

The method of detecting the presence of oil or other dielectric deposits below the surface of the earth, which comprises applying high-frequency alternating current electrostatically to the surface of the earth between points remote from each other, the short and long current paths thus formed being substantially in line and observing any difference between said currents, as an indication of the presence of such deposits, substantially as set forth.

Claims allowed - 14.

(1452) ELECTRICAL PROSPECTING METHOD

Charles Rodney Nichols and Samuel Hathaway Williston, co-inventors,
both of Dallas, Tex., U.S.A.

Canadian patent 328,563 Patent issued December 20, 1932.

This invention relates to the method of electrical prospecting which consists in so creating an electric current flow through the earth between separated earth energization points as to impress a readily identifiable potential condition or characteristic on a portion of the earth's surface which occupies, or is displaced from a definite predeterminable geographical location accordingly as the potential at the earth's surface in proximity to said location is not or is significantly affected by changes in the distribution of current flow through the earth produced by an earth body or bodies of different conductivity from the adjacent earth, and determining the extent and direction of displacement, if any, of said surface portion from said position.

Claims allowed - 28.

(1453) GEOPHYSICAL EXPLORATION METHOD

The Standard Oil Development Co., New York City, N. Y., assignee of
Orley H. Truman, Houston, Tex., both in the U.S.A.

Canadian patent 328,707 Patent issued December 20, 1932.

This invention relates to a method of underground exploration by means of impulses impressed upon the earth. The improvement comprises sending an impulse, sending a second impulse in such relation to the first that the indications of the two do not substantially conflict, receiving said impulses at the same station, noting the indications received, and estimating the underground structure therefrom.

Claims allowed - 10.

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A. No. 51 July, 1933.

DEPARTMENT OF COMMERCE
UNITED STATES BUREAU OF MINES
Scott Turner, Director
- - - -
GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1454) RESONANZMETHODE FÜR DIE MESSUNG DER GRAVITATIONSKONSTANTE MITTELS DER DREHWAAGE

(THE RESONANCE METHOD FOR MEASURING THE GRAVITATIONAL CONSTANT BY MEANS OF THE TORSION BALANCE)

By J. Zahradnicek

Physikalische Zeitschrift, Leipzig, vol. 34, No. 3, 1933,
pp. 126-133.

The measurements of the gravitational constant are carried out by the resonance method--that is, by means of oscillations performed by a secondary torsion balance in the periodically changeable Newton field of force of a primary torsion balance. The torsion balances used are described; some of the preliminary measurements, and the autograms of the excited and forced oscillations taken photographically, are given and discussed.

From the results of previous measurements the conclusion is drawn that the resonance method is well suited for measuring the gravitational constant owing to its simplicity and clearness.--Author's abstract translated by W. Ayvazoglou.

(1455) THE UPPER KAMA POTASSIUM SALT DEPOSITS (IN RUSSIAN)

By A. Ivanov

Transactions of the United Geological and Prospecting Service
of the U.S.S.R., Leningrad, No. 232, 1932, 154 pp.

The Upper Kama potassium salt deposits are located on the western slope of the Urals, 250 km north from the city of Perm at the Kama River.

Gravimetrical methods of prospecting were carried on since 1928 and were continued during the years 1929 and 1930.

The results of gravimetrical observations concerning the depth of the deposit did not agree entirely with the real data obtained by boring, but, in the opinion of the author, they were of importance for the first approximate determination of the character of the structure of the overburden, as well as of the possible depths of the salt deposit.--W. Ayvazoglou.

(1456) PLUMB-LINE DEFLECTIONS AND GRAVITY ANOMALIES IN GASPÉ PENINSULA AND THEIR SIGNIFICANCE

By F. J. Alcock and A. H. Miller

Transactions of the Royal Society of Canada, Ottawa, Third Series, vol. 26, Sec. 4, 1932, pp. 321-333.

Since beginning geological work in Gaspé some 10 years ago, F. J. Alcock considered this region suitable for studying isostasy in Canada and also for determining whether a study of plumb-line deflections and gravity determinations would throw any light on past or future vertical movements of this region.

The results of these investigations are given in this article and are summed up by the authors as follows:

1. When topography out to 2,564 miles is considered and no isostasy is postulated, the calculated deflections are over four times the observed deflections.

2. The assumption of isostatic compensation reduces the calculated deflections to values approaching the observed values. The anomalies for the best solution are about one half the observed deflections.

3. If the effects of compensation for a distance 70 miles from each station are not included in the compensation, the results for the deflections of the vertical agree somewhat better with the observed values than with results that are obtained by supposing all the topography surrounding the stations to be completely compensated. In the case of the single gravity station within the main part of the peninsula, the neglect of the local compensation reduces the gravity anomaly to zero. These results are, therefore, an indication that Gaspé is not compensated locally.

4. The deflection results point to either a high density off the coast to the east or a low density to the west. The gravity results are rather an indication of the latter, in which case the indication is that the topography extending to a considerable distance to the west is regionally over-compensated, while Gaspé is locally under-compensated. Without further investigation it is difficult to say whether there is any necessary contradiction between this conclusion and that previously mentioned, that the rather large depth of compensation found may be explained as an indication of average under-compensation over the whole area considered.--W. Ayvazoglou.

(1157) DIRECT MEASUREMENT OF THE GRAVITATIONAL EFFECT OF THE MOON

By Kenneth Hartley

Physics, Lancaster, Pa., vol. 4, no. 4, 1933, pp. 162-163.

The sensitivity of the gravity balance described in the March 1932 number of Physics (see Geophys. Abs. 38, p. 468) is such that a correction must be made for the effect of the attraction of the moon. The lunar effect has been measured by hourly readings over one complete cycle and agrees, within the observational error, with the effect calculated for the vertical component of the pull of the moon without any compensation for the centrifugal effect of the earth's motion around the center of gravity of the system. The effect has a period of 24.8 hours and not of 12.4 hours like the tides; there is no trace of the 12-hour period. Values of gravity plotted against time follow accurately a sine curve which shows a small time lag as compared with the theoretical curve. This does not seem to be accidental but has not been explained.--Author's abstract.

2. MAGNETIC METHODS

(1458) A STUDY FOR THE DEVELOPMENT OF A FIELD MAGNETOMETER BASED ON THE PRINCIPLE OF THE EARTH INDUCTOR

By P. I. Aguerrevere

Colorado School of Mines Quarterly, Golden, vol. 27, no. 3, 1932, pp. 11-29.

An abstract given by C. A. Heiland in The Mines Magazone, Colorado School of Mines, vol. 23, no. 2, 1933, p. 18, reads as follows:

> The adaptation of the earth inductor principle to the measurement of the magnetic horizontal, vertical, and total intensity and of the inclination and declination is discussed. A number of the more recent types of vertical-intensity magnetometers based on the earth-inductor principle are investigated, such as the one designed by D. la Cour, by D. W. Dye, etc., with a view of modifying such types into a practical field instrument. The design finally adopted, however, makes use of two compensating magnets, mounted on lateral extensions of the axis of rotation of the ring which supports the revolving coil. This arrangement eliminates the difficulties encountered in using Helmholtz coils attached to this ring. One of the magnets is intended for the compensation of the "normal" portion of the intensity measured and is kept stationary, while the smaller is moved until the compensation of the "anomalous" portion is indicated by zero current on the galvanometer. A temperature compensation is provided by attaching the magnet to a bimetallic deflection arm (designed similar to a compensated pendulum rod).

This earth-inductor is a "universal magnetometer", as any intensity mponent of the earth's field may be measured by placing the axis of revo- tion of the coil at right angles to the direction of the force component be measured.

(1459) A MAGNETIC SURVEY OF THE RALSTON DIKE, JEFFERSON COUNTY, COLO.

By W. S. Levings

Colorado School of Mines Quarterly, Golden, vol. 27, no. 3, 1932, pp. 30-41.

C. A. Heiland's abstract published in The Mines Magazine, Colorado chool of Mines, vol. 23, no. 2, 1933, p. 18, reads as follows:

> One purpose of this investigation was to disprove the assumption frequently found in the magnetic literature, that geological formations are magnetized solely by induction in the earth's field; another was to collect data on the abnormal polarization of igneous rocks. The object of the magnetic survey was a basalt dike north of Golden, about 1 mile long and 350 yards wide, striking approximately north-south and dipping 60° eastward, intruded into the upturned Fox-Hills and Pierre (Cretaceous) formations along their strike. At the surface, a basin occupied by a lake occurs in the middle of the dike. Magnetic observations were made on about 300 stations with a Schmidt vertical balance along a number of traverses across the dike. The anomalies encountered averaged 1,500 gammas in amplitude, with occasional negative peaks with amplitudes around 5,500 gammas.
>
> The distribution of the anomalies is very irregular and shows no relation whatever to the dimensions and arrangement of the dike. At a glance they are recognized as effects of individual poles or pole series in the basaltic mass. The extreme negative anomalies mentioned appear to occur most frequently on the topographic highs and might thus possibly be related to lightning, while the other irregularly distributed positive and negative anomalies may be explained by the pole effects of smaller basalt masses solidified earlier and overturned in the plastic flow. Some of these anomalies may, finally, be due to magnetizations of individual masses by stresses produced when the semiplastic magma was extruded to the surface.

(1460) MAGNETIC VECTOR METHOD REVEALS "EN ECHELON" STRUCTURE OF CONROE "TREND"

By W. P. Jenny

The Oil Weekly, Houston, vol. 69, no. 8, 1933, p. 39.

The principle of the magnetic vector method was explained by the author in one of his previous papers (Magnetic Vector Study of Regional and Local Geologic Structure in Principal Oil States; see Geophys. Abs. 46, p. 736). In this paper Jenny reveals a number of the following magnetic "en echelon" trends as indicated by taking into due consideration the direction and intensity of the vectors:

1. East of Columbus to south of Hempstead; along this trend lie the oil field of Raccoon Bend and a number of prospects.

2. South of Conroe; along this trend lie the Conroe field and the Tomball prospect.

3. South of Cold Springs-Woodville; along this trend lies the Sunshine oil field.

4. South of Jasper toward south of Leesville.

5. South of Newton toward south of DeRidder; along this trend lies the Spurger gas field; this trend may be followed magnetically eastward through Louisiana.

Geologic interpretation of magnetic trends is briefly discussed.--W. Ayvazoglou.

(1461) MAGNETOMETER SURVEY RESULTS

Editorial note

Engineering and Mining Journal, New York, vol. 134, no. 5, 1933, pp. 220-221

The note refers to the results of the magnetometer surveys by which Dr. Krahmann, in cooperation with Dr. Reinecke, has succeeded in locating the position of the Main Reef series (Africa) below the dolomites. These results are now being tested by a comprehensive drilling program.--W.Ayvazoglou.

3. SEISMIC METHODS

(1462) SEISMIC METHOD OF GEOLOGICAL PROSPECTING (IN RUSSIAN)

By P. T. Sokolov

Vestnik of the United Geological and Prospecting Service
of the U.S.S.R., no. 1-2, 1932, pp. 123-139.

After the description of the principles of seismic methods of prosecting and the apparatus used, Sokolov gives some data characterizing the eismic work carried out in Russia during 1930 and 1931, as well as the esults obtained.

A map showing the distribution of the seismic prospecting work in ssia is given. Especially good results were obtained in investigating e deep salt layers in the region of Emba. The seismic data were verified boring, and the average error was not over 15 meters at depths of 400 to 0 meters.—W. Ayvazoglou.

(1463) HYDRAULIC SEISMOGRAPHS

By S. K. Banerji and K. N. Sohoni

Nature, London, vol. 131, no. 3311, 1933, p. 547.

In this article the authors describe briefly the results of a series of xperiments carried out in the Colaba observatory to determine the possility of constructing seismographs with hydraulic magnification and damping. e results proved to be successful and the authors are of the opinion that, lthough the low free period of the system does not make the instrument very ensitive to earthquake waves, it is highly sensitive to artificial vibrations the ground and gives also good records of the sustained vibrations, such s microseisms. Being, besides, a compact and fully assembled portable intrument, it should form a valuable equipment for geophysical prospecting.

A detailed account of the investigation will be published in due course. -W. Ayvazoglou.

(1464) STUDY OF AN ADJUSTABLE WAVE FILTER SUITABLE FOR THE RECEPTION OF REFLECTED SEISMIC WAVES

By S. Pirson

Colorado School of Mines Quarterly, Golden, vol. 27, no. 3,
1932, pp. 43-64.

C. A. Heiland's abstract of this article, published in the Mines Magaine of the Colorado School of Mines, vol. 23, no. 2, 1933, p. 18, reads as ollows:

Experience with seismic reflection methods shows that in certain areas the frequency of the "ground roll" waves is lower than the frequency of the reflected waves. As one of the main problems in this work is to obtain a clear record of the reflected waves, one possibility of accomplishing this purpose is the use of an electrical filter system between electrical pick-up and recording galvanometer.

There are various ways in which such a filter system may be designed. The author investigates the characteristics of a "high-pass" filter which admits all frequencies above the adjusted cut-off frequency. The adopted design consists of two condensers in series with an inductance between them across the line. The value of the capacities and inductances required for the desired cut-off frequency was determined from the theory of the filter. A number of choke coils was tested and one with an inductance of 30 henries selected for the filter, which when used in conjunction with two 0.2 microfared condensers, gave a cut-off frequency of 46 for a single filter. This unit was then enlarged by adding a number of condensers with triple switch to give cut-off frequencies around 20, 15, 10, and 8 cycles. For several sections of this filter, the attenuations were computed and verified by passing current from a specially designed generator of constant but adjustable output and frequency, through the filter and through a resistance-coupled amplifier, and recording oscillographically with filter in and filter out.

(1465) THE TRIDIMENSIONAL VIBROGRAPH

By J. E. Shrader

Journal of the Franklin Institute, Lancaster, vol. 215, no. 4, 1933, pp. 455-469.

Demands made upon an apparatus for measuring and recording vibrations are enumerated, and a new instrument to meet these demands is described. The instrument examined in this paper has been tested over a period of several years and has been found to be reliable. This instrument, the tridimensional vibrograph, has been designed to record photographically on a moving film components of vibrations in three dimensions simultaneously.

The advantages of the apparatus are summarized by the author as follows:

1. The instrument records amplitudes, frequency, wave form and phase relation of the three components of vibration simultaneously without change in position or adjustment.

2. A true response to a large range of frequencies is secured by the use of light moving parts, a small spindle carrying a mirror and a beam of light for making a record instead of a relatively large pen or stylus.

3. The instrument is simple to operate. Few adjustments are required and the operations in making a record are nearly automatic. For this reason a skilled operator is not required and good results may be secured by the ordinary operator.

Several records, as well as a brief statement as to their source and he conditions under which they were made, are appended.--W. Ayvazoglou.

(1466) CERTAIN FIELD PROBLEMS IN REFLECTION SEISMOLOGY

By C. A. Heiland and W. E. Pugh

Mining and Metallurgy, New York, vol. 14, no. 315, 1933,
p. 170.

This is an abstract of the paper to be published by the American Insti-ute of Mining and Metallurgical Engineers (29 West 39th Street, New York). he abstract reads as follows:

> This paper discusses a few of the problems in reflection seismology, particularly three of them which the authors believe of vital importance for the future success of the reflection method. The first of these is concerned with the transmission of the shot signal which requires great accuracy. The time parallax introduced by the time of transmission of the shot signal electrically and the methods of initiating and transmitting this signal are discussed. The second problem is that of surface correction zones, and the authors take up the various difficulties of determining the thickness and characteristics of such zones. Complex zones in Colorado are described. The third problem is the accurate determination of average velocities, as upon this depends the computation and interpretation of reflection records. The application of the method of least squares is advocated, and its use in a special case of a horizontal reflecting bed is given. Finally, an example is cited of depth determination in three points, from the records made in the field with the Colorado School of Mines outfit.

(1467) LES SÉISMOGRAPHES POUR L'INSCRIPTION DE LA COMPOSANTE VERTICALE DU MOUVEMENT DU SOL

(SEISMOGRAPHS FOR RECORDING THE VERTICAL COMPONENT OF THE MOVEMENT OF THE GROUND)

By C. Bois

Le Journal de Physique et le Radium, Paris, vol. 3, No. 3,
1932, pp. 56-57.

A complete study of earthquakes requires the simultaneous recording of the movements of the ground in three directions: North-south, east-west, and in the vertical direction. Vertical seismographs are assigned for recording the vertical component. The author expects to offer and to discuss in the near future the results of his research work, relating to vertical seismographs, conducted by him during several years.--W. Ayvazoglou.

(1468) ELASTIC WAVES FROM A POINT IN AN ISOTROPIC HETEROGENEOUS SPHERE (PART I)

By Ryoiti Yoshiyama

Bulletin of the Earthquake Research Institute, Tokyo, vol. 11,
no. 1, 1933, pp. 1-13.

In this article Yoshiyama gives a mathematical discussion on the general solution of waves diverging from a point in an isotropic heterogeneous sphere in which the elastic constants and density are certain functions of a radial distance only from the center of the sphere. A solution for a special case is given.--W. Ayvazoglou.

(1469) OBSERVATIONS OF NEAR EARTHQUAKES ON MT. TSUKUBA WITH AN ISHIMOTO ACCELERATION SEISMOGRAPH

By W. Inouye

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 11, no. 1, 1933, pp. 69-81.

In this article the author examines the observations made on earthquake waves near the Mount of Tsukuba.

1. Instruments.
2. The periods of earthquake waves.
3. The relation between the magnitude of acceleration and the intensity of earthquakes.
4. Echoes or internal reflections of seismic waves.
5. The scattering of seismic waves.

Inouye concludes: "(a) The period of seismic waves most frequently observed with the acceleration seismograph at Mr. Tsukuba is 0.08 sec.; (b) the slightest acceleration of earthquakes which can be felt by the human body at Mt. Tsukuba is 1.7 gal. The sensibility of human body to earthquakes is in some respect alike to the sensitivity of a pendulum to external forces; (c) earthquakes observed at Mt. Tsukuba usually consist of many wave groups as the result of echoes or multiple reflections from the boundaries of layers in the earth's crust; (d) some earthquake phenomena seem to be due to scattering of seismic waves by certain objects in the earth's crust or below it."

(1470) DETERMINATION DE LA LIMITE PERCEPTIBLE DES SECOUSSES

(DETERMINATION OF THE PERCEPTIBLE LIMIT OF SHOCKS)

By M. Ishimoto and M. Octuka

Bulletin of the Earthquake Research Institute, Tokyo, vol. 11,
no. 1, 1933, pp. 113-120.

The authors describe an oscillation platform designed by them. Owing the fact that the frictions of wheels or of balls make it impossible to tain smooth movements of the platform, especially in case of large riods, it is almost impossible, in the opinion of the authors, to create nditions for an entirely sinusoidal movement, the authors constructed a stem in which the platform was suspended. A description of this platform given and the results of experiments carried out are discussed.--W. vazoglou.

4. ELECTRICAL METHODS

(1471) APPLICATION OF RESISTIVITY METHODS TO NORTHERN ONTARIO LIGNITE DEPOSITS

By R. H. Hawkins

Mining and Metallurgy, New York, vol. 14, no. 315, 1933, p. 169.

This is an abstract of the publication to be issued by the American stitute of Mining and Metallurgical Engineers (29 West Thirty-ninth Street, w York). The abstract reads as follows:

> An investigation of the applicability of geophysical methods to differentiate good and barren areas of the northern Ontario lignite deposit, undertaken in 1930, has included gravitational, magnetic, and electrical resistivity studies. This paper deals with resistivity methods only, measurements having been made by the central electrode, the single distant probe, and Wenner's and Lee's partitioning methods. The instruments used in the field included a megger, a potentiometer and milliammeter system with auxiliary commutator, and a "deflection potentiometer" designed and constructed specially for the conditions found. Initial laboratory measurements on samples of clays and of lignite, surface field measurements in summer and winter, and small-scale "in situ" resistivity studies in a shaft and underground workings are described in sequence. The intial laboratory tests indicated that the lignite was from two to twelve times as conducting as the clay samples submitted. Preliminary field tests gave resistivity data which could be correlated in a reasonable degree to the drilling records, and gave promise that the methods would reveal the presence of lignite and the depth of overburden. Further measurements in more extended surveys showed that no general consistent

differentiation between good and barren lignite areas could be obtained by the resistivity methods used chiefly because the character and resistivity of the overburden was too variable, changing considerably in short distances, and because the ratios of the resistivities of the clays to that of lignite were too small. Studies in the underground drifts showed that the lignite and the associated Cretaceous clays had almost identical resistivities; underground saline waters, randomly distributed, were quite highly conducting. Along with the lack of uniformity of the overburden, the water-soaked conditions of the area with widespread distribution of brackish waters was believed to determine in large measure the resistivity conditions, and to make resistivity methods inadequate.

(1472) LA PROSPECTION ÉLECTRO-MAGNÉTIQUE ET LES MINES D'OR SUÉDOISES DE BOLIDEN

(THE ELECTROMAGNETIC PROSPECTING AND THE SWEDISH GOLD MINES OF BOLIDEN)

By Christian de Caters

La Nature, Paris, no. 2884, July 1, 1932, pp. 27-30.

A brief description of the principles of electrical and electromagnetic methods of prospecting is given. The main part of the article consists of information concerning the Boliden gold mines. According to the author, the production of gold may soon reach 1 ton per month.

A few examples of the results obtained by the electromagnetic methods of prospecting in various parts of the world are briefly mentioned.--W. Ayvazoglou.

(1473) EIN NEUES MESSGERÄT ZUR AUFSUCHUNG VON EDELMETALLSEIFEN UND ERODIERTEN ERZGÄNGER

(A NEW MEASURING DEVICE FOR DISCOVERING PRECIOUS METAL PLACERS AND ERODED MINERAL LODES)

By J. B. Ostermeier

Metall und Erz, Berlin, vol. 30, no. 2, 1933, pp. 21-24.

The author examined the ratio of concentration of placer deposits in a river bed in Columbia by means of a new method and a new device for measuring spontaneous contact potentials. The new arrangement for the application of the method consisted of a small handy measuring device connected to a rod-shaped searching probe.--Author's abstract translated by W. Ayvazoglou.

(1474) POTENTIAL DISTRIBUTION ABOUT AN ELECTRODE ON THE SURFACE OF THE EARTH

By Morris Muskat

Physics, Lancaster, Pa., vol. 4, no. 4, 1933, pp. 129-147.

An analytical study is made of the potential distribution about an ectrode on a stratified earth, from the point of view of developing special rmulas appropriate for computation at small and large distances from the ectrode. Power series in the distance for small distances and simple symptotic expansions for large separations are derived first for a two-yer earth, from integral expressions for the potentials. For graphical tegration a transformation is derived which makes the integrals converge ery rapidly. For a many-layer earth a general method for deriving the wer series for small distances is indicated. For large distances, general pansions are given in closed and asymptotic forms applying to all types f conductivity variation. Explicit expressions for the power series are ven for a three layer earth with the middle layer of thickness equal to d twice that of the upper layer. Closed and very rapidly converging series Hankel function expansions are then developed for the third layer having ro or infinite conductivities, with the thickness of the middle layer being ual to, twice, and three times that of the upper layer. Thirty numerical ses have been computed and plotted as curves to illustrate the fundamental rmulas developed. In an appendix general proofs are given for the symptotic expansions of not only the type of integrals occurring in the esent problem but also for integrals involving Weber and Hankel functions s well as the Bessel functions, and where these functions are of non-zero rders.--Author's abstract.

5. RADIOACTIVE METHODS

(1475) RADIUM CONTENT OF OCEAN-BOTTOM SEDIMENTS

By Charles Snowden Piggot

American Journal of Science, New Haven, vol. 25, no. 147, 1933, pp. 229-238.

The radium content of 23 (27 from the Pacific) samples of ocean-bottom ediments was determined, and similar determinations reported by Joly and etersson are included for comparison. These comprise practically all such eterminations that have been made, and the paucity of these data in com-arison to the extent, importance, and high radium content of the material s emphasized. Those bottoms composed mostly or entirely of red clay gener-lly contain more radium. A mechanism for explaining the high radium content f deep-sea sediments is suggested which does not coincide with the opinions f either Joly or Petersson.--Author's abstract.

7. UNCLASSIFIED METHODS

(1476) GEOPHYSICAL PROGRESS DURING THE LAST YEAR

By F. W. Lee

Mining and Metallurgy, New York, vol. 14, no. 317, 1933, pp.217-220.

Achievements attained by geophysical prospecting during the last year in various parts of the world are briefly described. Among them are mentioned: (1) The tracing of the expansion of the Rand approximately 40 miles beyond the known western limit of the Main Reef by means of magnetic methods of prospecting; (2) the combined work of the New Zealand Government and the universities in searching for gold-bearing quartz reefs by electrical methods; (3) the progress made in the United States by the gravity methods, electrical and magnetic methods, radioactive methods, and seismic methods, as outlined by R. W. Clark of the Gulf Companies; (4) D. C. Barton's information on the geophysical work done by the petroleum companies during 1932. Here the most notable development is probably that in the measurement of the relative gravity. The probable error of the determination of Δg is reported to be attaining an observational accuracy of ±0.1 milledyne. (5) J. C. Karcher's information concerning the attainments in the reflection methods of prospecting; several areas to indicate the scope and effect of the seismograph are listed; the electrical resistivity surveys and treatments presented by Roman, Hummel, and Tagg of more complicated cases are mentioned; (6) the information on the effectiveness of seismic methods attained in various parts in the United States given by F. E. Wright, and (7) C. L. Alexanian's review of the progress in geophysical work made in France, in which the gravimetric, magnetometric, and industrial work carried out in France and its colonies are discussed.

In conclusion, Lee notices the expansion in the curricula of geophysics in some universities of the United States.--W. Ayvazoglou.

(1477) ZUR THEORIE DER SCHWINGUNGSMESSER

(ON THE THEORY OF THE VIBRATION INDICATOR)

By H. W. Koch and W. Zeller

Zeitschrift für Instrumentenkunde, Berlin, vol. 53, no. 2, 1933,
pp. 64-70.

A mathematical discussion of the theory of a vibration indicator is given.

The authors examine also the question concerning the influence of the value of the phase displacement of the assumed force upon the amplitude and phase of the natural vibration of the vibration indicator.--W. Ayvazoglou.

(1478) EINIGE NEUERE ANWENDUNGEN DER GEOPHYSIK BEI TALSPERREN-UND GRUNDWASSER-PROBLEMEN

(SOME NEW APPLICATION OF GEOPHYSICS TO THE PROBLEMS OF CONSTRUCTING WALLS ACROSS THE VALLEYS AND TO UNDERGROUND WATER PROBLEMS)

By C. A. Heiland

Geologische Rundschau, Special number dedicated to Salomon-Calvi,
vol. 23a, 1932, pp. 279-303.

Contents: Introduction.

I. Problems of engineering-geology solvable by geophysics.

I. Potential methods:

(a) Resistance methods:

1. Tracing on maps of resistances (Widerstands-"Kartieren").
Examining of resistances by probes (Widerstands-"Sondieren").
Arrangement of electrodes.

2. Apparatus.

3. Methods of interpretation.

(b) Racom-method (potential quotient method).

1. Arrangement of electrodes.

2. Apparatus.

3. Methods of interpretation.

(c) Results of electric measurements.

II. Seismic refraction methods.

(a) Apparatus and interpretation.

(b) Results.

IV. Supplement.

The translation of the author's abstract reads as follows:

In this article the author gives an account on some applications of geophysical methods of prospecting as approved by practice. Practical application and the arrangement of instruments in new

electrical methods (resistance method, potential quotient method) as well as in the seismic refraction method are described, and the methods of interpretation of the measurements are examined. The few examples of the successful applications of these methods in engineering geology will prove to the reader that geophysics is qualified to occupy in the future an important role in engineering geology. The methods in consideration are inexpensive and rapid, their improvement in the near future can also be expected, especially concerning the indisputable interpretation of the results.
--W. Ayvazoglou.

(1479) OIL INDUSTRY PREPARING FINE EXHIBIT FOR WORLD'S FAIR

By Irwin E. Lamp

The Pure Oil News, Chicago, vol. 15, no. 10, 1933, pp. 10-11.

This article concerns the exhibition of models at the World's Fair in Chicago by which the full range of oil-company operations will be shown, such as: (1) Refining; (2) geological-aerial exploration and mapping; (3) geophysical surveying; (4) deep drilling, subsurface geology, and allied subjects; and (5) production, storage, and transportation.

The application of geophysical instruments to the problems of the field geologist will be fully explained. The principles of the magnetometer, torsion balance, and electrical and seismic methods will be elucidated by animated models, dioramas, charts, transparencies, etc. This work is being accomplished at the Colorado School of Mines under the direction of Prof. C. A. Heiland.--W. Ayvazoglou.

(1480) RECENT DEVELOPMENTS IN TEXAS AND LOUISIANA GULF COAST

By J. Brian Eby

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 17, no. 5, 1933, pp. 558-561.

The purpose of the writer of this article is to summarize briefly the more salient features of the discoveries in the Texas and Louisiana Gulf Coast areas and their relationship to exploration and development.

Oil- and gas-producing structures in the Gulf Coast district are located in one of three ways: By torsion balance, by seismograph, or by wildcat drilling, either with or without the use of surface geologic indications. Most frequently locations are directed through the combined efforts and data of the geologist and geophysicist.

Places discovered by one of the above-mentioned methods are enumerated, and their features are discussed.--W. Ayvazoglou.

(1481) EINE NEUE GEOPHYSIKALISCHE SCHÜRFMETHODE INSBESONDERE FÜR KOHLENSTOFF LAGERSTÄTTEN

(A NEW GEOPHYSICAL METHOD OF PROSPECTING, ESPECIALLY FOR HYDROCARBON DEPOSITS)

By J. Laubmeyer

Petroleum Zeitschrift, Berlin, vol. 29, no. 18, 1933, pp. 1-4.

In this article the author discusses a method of prospecting for oil by which contrary to the most of the other geophysical "indirect" methods (with the exception of the radioactive method), direct results can be obtained.

The fundamental idea of this method consists of catching hydrocarbon gases emanating from deposits containing oil (similar to the radioemanation from deposits containing radium), and of measuring quantitatively the amount of this emanation at a series of stations.

The author succeeded in constructing an apparatus by means of which very small amounts of methane (1 liter of methane in 10^{10} liters of air) can be disclosed and measured.

The apparatus developed by the author is inserted in small boreholes (1 to 2 meters deep) and left inside of the hole for about 24 hours. The apparatus is provided with an arrangement by which the hole can be made air-tight.

Based on the measurements of the amount of gas at various stations, profiles are drawn similar to those used in other geophysical methods.

The construction of the apparatus is explained and the method of operation is described and illustrated by maps showing the results of the work carried out by the author in Oberg (near Hannover) and in Doiçesti and Jalomitatal in Rumania.--W. Ayvazoglou.

(1482) GEOLOGY APPLIED TO MINING IN THE DUCKTOWN DISTRICT

By H. F. Kendall and J. H. Ffolliott

Mining and Metallurgy, New York, vol. 14, no. 316, 1933, pp. 175-179.

The present paper discusses the work of the geological organization of the Tennessee Copper Co.

Under the heading Geophysical Methods Tried, the authors mention that in 1928 a trial survey using the electromagnetic type of instrument was made. It was evident from this survey that the method will react to the large bodies of massive pyrrhotite ores. More recently the Hotchkiss superdip needle has been used in an attempt to establish a rapid, cheap, and reliable method for further checking of surface data before exploring prospective orebodies underground or by diamond drilling. It was established that the typical heavy sulphide ores of the Ducktown district can definitely be located, when in large masses, within 400 feet of the surface. The reactions of the instrument over the lower grade and narrower sulphide orebodies was less satisfactory. This partially limits the use of the instrument as a rapid means of eliminating profitless territory. But, coupled with a surface survey of the structure, possible types of mineralization and rock formations of an area, the instrument has proved valuable in locating hidden features.--W. Ayvazoglou.

(1483) LA GÉOLOGIE PROFONDE DE LA FRANCE D'APRÈS LE NOUVEAU RÉSEAU MAGNÉTIQUE ET LES MESURES DE LA PESANTEUR

(THE DEEP GEOLOGY OF FRANCE AS BASED ON THE NEW MAGNETIC NET-SYSTEM AND GRAVITY MEASUREMENTS)

By Jean Jung

Reprinted from the Annales de l'Institut de Physique du Globe de l'Université de Paris, no. XI, 1933, pp. 1-48.

Contents:

Definitions and principles: (1) The anomalies; (2) gravity anomalies; (3) magnetic anomalies.

Deep geology of France: A. The Alpine France: (1) The chain of the Alps; (2) the anomalies of the crust in the foreland of the Alps; (3) The regional anomalies in the foreland of the Alps. B. The Hercynian France (Ardennes; east, center, and the basin of Paris; Bretagne; central and southwest massif).

Conclusion: The infrastructure of France and the constitution of the earth's crust.

The author proposes to apply the term "deep geology" to the study, by means of the physics of the globe, of those depths of the earth's crust which cannot be reached by boring.

In the present article the author examines the geological conditions existing in the gneiss-granitic crust and its substratum, that is at a depth of about 100 kilometers below the surface.--W. Ayvazoglou.

(1484) THE TRAVEL OF WIRELESS WAVE

Editorial note

The Engineer, London, vol. 155, no. 4034, 1933, pp. 454-455.

In this article a review of a lecture delivered by Sir Frank E. Smith before the Institution of Electrical Engineers in London is given.

The first part of the lecture covered the work of Clerk Maxwell, Herz, Kelvin, Marconi, G. N. Watson, and others who undertook investigations in connection with the travel of electromagnetic waves.

The second part was devoted to the geophysicists' world, which was shown to consist of a solid earth surrounded by a troposphere, stratosphere, ozonosphere, and ionosphere.

The other items of the subject were: (1) The radiotelegraphists' wave; (2) how the waves travel; (3) medium waves; (4) long waves; (5) the radiotelegraphist turned geophysicist; (6) proof of existence of layer; (7) evidence of a second layer; and (8) modification of conclusions.--W. Ayvazoglou.

(1485) THE CONTRIBUTION OF RADIOTELEGRAPHY TO GEOPHYSICS

Editorial note

Nature, London, vol. 131, no. 3314, 1933, pp. 642-643.

A review of the lecture delivered by Sir Frank Smith before the Institution of Electrical Engineers in London under the title The Travel of Wireless Waves is given in this article. A picture was presented of the position attained by modern research on the mode of propagation of the electric waves employed in radio communication. Particular reference was made to the bearing of the results of this work on the general problems encountered in geophysics. (See also the preceding abstract, No. 1484).--W. Ayvazoglou.

(1486) OIL-GEOPHYSICS PROGRESS IN 1932

By Paul Weaver

The Petroleum Times, London, vol. 29, no. 744, 1933, p. 398.

The amount of geophysical surveying, particularly in the Gulf Coast area of Texas and Louisiana, increased during 1932. Almost exclusively gravity and reflection-seismograph surveys were used. The total number of geophysical troops in this territory increased from 16 to 40 during the year.

An attempt was made to use the reflection-seismograph method for the construction of subsurface contour maps. The depth of the geological formations used in contouring by the reflection method was usually between 4,500 and 6,000 feet. Sometimes the reflection horizons have been over 8,000 feet. The sensitivity of the detectors has been increased to such an extent that the consumption of the dynamite used in the shots has been reduced to about 10 percent of the total cost of the operations, which now range from $3,000 to $5,000 per month per troop. The total outlay for gravity and seismograph surveys in the Gulf Coast district is now approvimately $175,000 per month and is approximately one half as much more in the rest of the United States. --W. Ayvazoglou.

(1487) THE OUTLOOK FOR GOLD MINING IN SOUTHERN RHODESIA

Editorial note

The Rhodesian Mining Journal, Johannesburg, vol. 7, no. 70, 1933, pp. 103-104.

The author of this note advocates geophysical methods of prospecting, especially magnetometric methods, to be applied for the discovery of the precious metal deposits in Southern Rhodesia. Referring to the recent success in locating the position of the main reef series below the dolomite by Krahmann and Reinecke, the author writes that, although geological conditions on the Witwatersrand are very different, there are nevertheless in Matabeleland and Mashonaland certain potential gold-bearing deposits associated with banded ironstones and schists which would be well worth investigating by modern geophysical methods.--W. Ayvazoglou.

10. PATENTS

(1488) PROCESS OF LOCATING BURIED PIPE LINES, ETC.

Thomas S. West, of Nowata, Oklahoma

United States patent 1,893,311 Patent issued January 3, 1933.

This invention relates to electrical circuits generally and the object of the invention is to provide reliable means for locating pipe lines, cables, or conduits at points where their exact location is not known. With slight modifications this invention can also be used for the location of subsurface electrical inhomogeneities of any nature.

Claims allowed - 3.

(1489) MIT METALLISCHER SCHUTZHÜLLE VERSEHENE RAHMENANTENNE ZUR AUFNAHME EINES MIT KONSTANTER STÄRKE ÜBERTRAGENEN HOCHFREQUENZ-SIGNALS BEI ELEKTROMAGNETISCHEN SCHÜRFVERFAHREN

(FRAME ANTENNA FOR RECEIVING HIGH-FREQUENCY SIGNALS OF CONSTANT INTENSITY, USED IN ELECTROMAGNETIC METHODS OF PROSPECTING, PROVIDED WITH PROTECTING METALLIC COVER)

Ernest Hall Chapman of Brooklyn and Thomas Bedford in Stancliffe Hall, Derbyshire, England

German patent 564,143 Patent issued November 14, 1932.

This patent uses a frame antenna for receiving high-frequency signals of constant intensity. The antenna is provided with a protecting metallic cover which, in the case of known wave lengths, serves for the adjustment to the most favorable damping of the antenna by bending the protecting cover at fixed places toward the winding of the antenna.

Claim allowed - 1.

(1490) DREHWAAGE NACH EÖTVÖS

(TORSION BALANCE ACCORDING TO EÖTVÖS)

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-Friedenau of Berlin-Friedenau.

German patent 565,347 Patent issued December 6, 1932.

A torsion balance with more than one hanging device (Gehänge) is the subject of this patent. Each hanging device is secured in a special part of the casing. The parts are interchangeable and are fixed at the sides of a central body. The central body contains the optical and the reading and registering devices.

Claims allowed - 12.

(1491) VERFAHREN UND VORRICHTUNG ZUM AUFSUCHEN VON LAGERSTÄTTEN

(METHOD AND APPARATUS FOR DISCOVERING DEPOSITS)

Dr. Günther Laubmeyer of Kassel-Wilhelmshöhe.

German patent 567,698 Patent issued January 7, 1933.

The invention relates to an apparatus by which ground air can be caught and the gaseous constituents of this air examined quantitatively. Only those gases, especially the hydrocarbons, are measured which owing to their small molecular weight diffuse easily from great depths to the surface of the earth.

Claims allowed - 3.

(1492) PENDEL FÜR SCHWEREMESSUNGEN

(PENDULUM FOR GRAVITY MEASUREMENTS)

Firma Carl Zeiss of Jena

German patent 567,699 Patent issued January 7, 1933.

The invention relates to a pendulum for gravity measurements inside of which a temperature equalization body, the coefficient of expansion of which is greater than that of the body of the pendulum, is fixed. This equalization body, the length of which is about one half that of the pendulum, is soldered to the screw secured at the bottom of the pendulum.

Claim allowed - 1.

(1493) INTEGROMETER

Askania-Werke A.G. vormals Centralwerkstatt Dessau und Carl Bamberg-Friedenau of Berlin-Friedenau.

German patent 568,474 Patent issued January 24, 1933.

This invention relates to a device designed for the calculation of integrals, especially of those serving for the evaluation of geophysical field data, such as:

$$\int f(r) \sin n \varphi \, dr \text{ , and}$$

$$\int f(r) \cos n \varphi \, dr$$

in which $f(r)$ is a given function of the section of the guide ray (Leitstrahlabschnitt) r, φ the angle of the guide ray in a plane coordinate system, and n is any number.

Claims allowed - 46.

(1494) VORRICHTUNG ZUR BEEINFLUSSUNG DER NULLAGE BEI MAGNETISCHEN VERTIKALWAAGEN

(AN ARRANGEMENT FOR THE CONTROL OF THE ZERO POSITION IN THE MAGNETIC VERTICAL BALANCES)

Hauser and Co. G.m.b.H of Augsburg

German patent 570,498 Patent issued April 16, 1932.

This invention relates to an arrangement by which the zero position of magnetic vertical balances can be controlled. The arrangement consists of a rotatory deflecting system secured above or below the axis of rotation of the oscillating field-balance system. The deflecting system rotates around an axis parallel to the magnetic axis of the oscillating balance system.

Claim allowed - 1.

(1495) STATISCHER SCHWEREMESSER

(A STATICAL APPARATUS FOR GRAVITY MEASUREMENTS)

Hauser and Co. G.m.b.H. of Augsburg

German patent 570,778 Patent issued February 20, 1933.

The invention relates to an arrangement serving for an improved temperature compensation. The apparatus consists of one or several force accumulators (Kraftspeicher) (for example, springs) which are exposed to the absolute or relative weight of the column of a liquid. The force accumulator is immersed entirely or partly in the liquid, thus adapting the temperature of the latter.

Claims allowed - 2.

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DEPARTMENT OF COMMERCE
UNITED STATES BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1496) UNE PROSPECTION GÉOPHYSIQUE EN HESBAYE

(GEOPHYSICAL PROSPECTING IN HESBAYE)

By G. de Grandry

Bulletin de Société Belge Géologique, vol. 41, 1931, pp. 77-82

The translation of the abstract of this paper published by M. Henglein in the Neues Jahrbuch für Mineralogie, Geologie und Palaontologie, Stuttgart, 1933, No. 1 (Allgemene Geologie), pp. 31-32, reads as follows:

> Gradients and isogams were determined by gravimetric measurements with the Eötvos torsion balance. The isogams have a certain similarity with the contour curves showing the contact between the chalk and eruptive rocks. If the densities of the rocks are known a priori, the intensity of the gravity can be calculated for a great number of points and the isogams can be drawn. The experimental and theoretical isogams are compared. A satisfactory conformity of the results is obtained by successive approximation. Several borings carried out for checking the results had shown an approximation of 10 percent of the depth.
>
> Gravimetrical prospecting for drinking water for the city of Liège in the region of Fexhe-le-Haut-Clocher and the geological structure of Hesbaye, a large plateau with quarternary deposits of Mesozoic and Tertiary strata over the Silurian and eruptive rock strata, are described.--M. Henglein's abstract translated by W. Ayvazoglou.

(1497) EINE GRAVIMETRISCHE VERMESSUNG IM SÜDWESTLICHEN MECKLENBURG

(GRAVIMETRICAL MEASUREMENT IN SOUTHWESTERN MECKLENBURG)

By Theodor L. Zoeltsch

Mitteilungen aus der Mecklenburgischen Geologischen Landesanstalt
Rostock, No. 4, New series 6, 1933, pp. 107-127

The purpose of the investigation described in this paper and carried out in 1931, was to establish the further extent of the salt-dome border in the southeastern direction, and to determine the structural conditions of the subsoil in the region of Alt-Jabel and to the east of it. This purpose was to be accomplished by means of an extensive network of torsion-balance stations.

The procedure of the gravimetric measurements is described in detail, and the data of gradients and of values of curvature for each station are given in a table. The last part of the paper deals with the geological interpretation of the results of the gravimetrical investigation. Two maps of the regions investigated and showing the borders of the salt domes are added.--W. Ayvazoglou.

(1498) ÜBER EINIGE AKTUELLE FRAGEN DER PHYSIKALISCHEN GEODÄSIE

(ON SEVERAL ACTUAL QUESTIONS OF PHYSICAL GEODESY)

By F. Hopfner

Gerlands Berträge zur Geophysik, Leipzig, vol. 38, No. 3/4, 1933,
pp. 309-320

In this article the author reviews:

1. The formula for the valuation of undulations,
2. Ackerl's value for the oblateness,
3. The free-air formula, and
4. The boundary problem of geodesy.

--Author's abstract.

(1499) KRITISCHE RECHTFERTIGUNG DER KONTRAKTIONSHYPOTHESE

(CRITICAL JUSTIFICATION OF THE HYPOTHESIS OF CONTRACTION)

By Friedrich Nölke

Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, No. 2, 1933,
pp. 172-194

The chief objections against the hypothesis of contraction are treated, nd it becomes evident that they have no conclusive power, as they are based n suppositions which either are not confirmed by the observations or are of nother nature.--Author's abstract.

(1500) GRAVIMETRIC AND MAGNETIC BALANCE

By G. Petrucci

N. Cimento, No. 9, Aug.-Sept.-Oct., 1932, pp. 270-276

The abstract published in Science Abstracts, Section A, Physics, vol. 36, Jo. 422, 1933, p. 130, signed J.H.A., reads as follows:

> Further consideration is given to the precision attainable with the apparatus described previously. Taking into account the accuracy with which the center of gravity can be set relative to the axis, and also the inductive effect of the earth's magnetic field on the magnet used in the apparatus, it is concluded that it should still be possible to detect variations of 10^{-5} cm per sec. in "g", the acceleration due to gravity. This is about 100 times better than can be obtained with a pendulum, and moreover, an observation with the new apparatus would require only a short time.

(1501) GRAVITATION UND ERDMAGNETISMUS. PART I.

(GRAVITATION AND TERRESTRIAL MAGNETISM)

By Teodor Schlomka

Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, No. 3/4, 1933,
pp. 357-406

The question of gravitation and terrestrial magnetism is discussed by the author under the following headings:

1. Examination of the rotatory theories of the terrestrial magnetism.
2. General remarks on the theory proposed.
3. Examination of the existing theories of gravitation.
4. Historical development of the electrical gravitation theories.
5. The electromagnetic field of rotating balls charged with electricity, for observers in rest and for those taking part in the rotation.
6. Remarks on the conclusions derived above.
7. Determination of the constants α and β from gravitation and terrestrial magnetism.
8. Conclusions and critical remarks.
9. Notes and bibliography.

--W. Ayvazoglou.

2. MAGNETIC METHODS

(1502) A METHOD OF CORRELATING SURFACE AND UNDERGROUND SURVEYS BY MEANS OF THE MAGNETIC NEEDLE

By E. Holden

The Colliery Guardian, London, vol. 146, Nos. 3771 and 3772, 1933,
pp. 633-635 and 675-677

Holden outlines in this article a method of correlation of surface and underground surveys. According to his method, it is necessary to establish two lines, one on the surface and the other underground, both free from local magnetic attraction. Two dials are used for the purpose of the magnetic observations. Two observers are necessary. The observations are repeated with the positions of the dials and observers reversed. Thus two sets of observations on the surface and two sets underground are obtained. The difference between the average bearings, surface and underground, is theoretically the angle between the two lines. The bearing of the surface line will be in terms of the surface survey meridian. By applying the difference of the average bearings to the bearing of the surface line, the bearing of the underground line is obtained. An example is discussed.--W. Ayvazoglou.

(1503) AN APPAREIL POUR DETERMINER LES PROPRIETÉS MAGNÉTIQUES DES ROCHES

(APPARATUS FOR DETERMINING MAGNETIC PROPERTIES OF ROCKS)

By G. Grenet

Bulletin de l' Institut et Observatoire de physique du Globe du Puy-de-Dôme,
No. 6, 1933, pp. 57-64

In making interpretations of magnetic surveys it is important to determine the permanent magnetization of the rocks as well as their magnetization induced by the terrestrial magnetic field. These measurements ought to be made without difficulty and, if possible, without the necessity of cutting the samples according to a definite form. Finally, the surveyor must be able to estimate the whole magnetization manifested on the terrain by a measurable magnetic disturbance.

The apparatus described by the author answers the conditions mentioned above. It is based on the use of an induction method and is characterized by the utilization of a galvanometer with a mobile magnet of great sensitiveness.
--Author's abstract translated by W. Ayvazoglou.

(1504) L'ANOMALIE MAGNÉTIQUE DU PUY-DE-DOME

(MAGNETIC ANOMALY OF THE PUY-DE-DOME)

By J. Coulomb

Bulletin de l'Institut et Observatoire de Physique du Globe du Puy-de-Dôme,
Paris, No. 6, 1933, pp. 65-93.

The enormous anomaly known already to Brunhes and Davis in 1902 was established again. Some of the results concerning the horizontal component could be explained by the symmetry of the disturbing field. The study of the vertical component was difficult owing to the interference of too many accidental variations. Notwithstanding this it was established that the mean magnetization of the mountain was higher than that shown by the samples lying near the surface. It was finally established that the anomaly varied during the last 30 years in an important and regular manner; the explanation of this variation could not be given.--W. Ayvazoglou.

(1505) ESTUDIO SOBRE LA AGUJA DE INCLINACION

(A STUDY CONCERNING THE DIP NEEDLE)

By Tomas Barrera and Alfredo Banos, Jr.

Secretaria de la Economia Nacional, Departamento de Petroleo, Seccion de Geofisica, Mexico, Technical Publication No. 1, March, 1933, 29 pp.

In this publication the authors give an analysis of the theory of the dip needle, typical experimental results obtained in the field, as well as geological interpretation of these results.

The contents of the paper are:

Introduction.
Description of the needle.
Fundamental principles.
Method of the use of the dip needle.
Equation of the equilibrium.
Sensitiveness of the needle.
Sensitiveness of the needle in function of azimuth.
Value of the scale.
Eccentricity of the counterbalance.
Determination of the constants of the needle:

(a) Determination of the factors: (Wa/M), (Wb/M), (Wd/M),
(b) Determination of the magnetic moment of the needle.

Behavior of the needle.
Experimental work in the field.
Discussion of the results of the experiments.
Practical conclusions.
Bibliography.

--W. Ayvazoglou.

(1506) MAGNETISCHE MESSUNGEN IM SUDWESTLICHEN MECKLENBURG

(MAGNETIC MEASUREMENTS IN THE SOUTHWESTERN MECKLENBURG)

By Fritz Brinkmann

Mitteilungen aus der Mecklenburgischen Geologischen Landesanstalt, Rostock, No. 41, New Series 6, 1933, pp. 5-41.

The article is divided into the following four parts:

Part I. Location, size, and configuration of the region under investigation.

Part II. Magnetical method of exploration, with a map of isanomalies of the magnetic vertical intensity of southwestern Mecklenburg, and a series of magnetic profiles.

Part III. Geological interpretation of the results of the investigation.

Part IV. Bibliography.

In concluding the article the author says that the main purpose of his paper is to make more clear the relations between the terrestrial magnetism and the geological conditions of the subsoil of the region. Another purpose is to establish the dependence of the isanomalies from the structural conditions, and to find some argumentations and proofs concerning the opinion of various investigators (Schuh, Reich) with regard to the geological causes of magnetic disturbance variations within a large area.--W. Ayvazoglou.

(1507) APPLICATION OF THE MAGNETOMETRIC METHOD OF PROSPECTING FOR GOLD AND PLATINUM DEPOSITS (IN RUSSIAN)

By Sofronov

Vestnik of the United Geological and Prospecting Service of the U.S.S.R., vol. 6, No. 5/6, 1931, pp. 48-58

The question of the application of the magnetometric investigation of gold and platinum placer deposits based on the results obtained in various countries, especially in the United States, is examined.

The following conclusions are drawn finally by the author:

1. The application of the magnetometric investigation must be considered possible from both theoretical and practical viewpoints.

2. Based mainly on the results obtained by Heiland (Heiland, C. A., and Courtier, W. H., Magnetometric Investigation of Gold Placer Deposits near Golden, Colo.: Geophys. Prospecting, 1929, pp. 364-385; see Geophys. Abs. 12, p. 5), the author expresses the opinion that Schmidt's vertical balance is the best instrument answering the purpose of magnetometric investigation.

3. The cost of a magnetometric survey per 1 square Kilometer by using one Schmidt's balance and one deflection magnetometer, the latter for determining the details, is calculated: 50 Schmidt's balance stations, about 12 roubles per station; and 250 deflection magnetometer stations, about 3 roubles per station:

$$(50 \times 12) + (250 \times 3) = 1{,}350 \text{ roubles.}$$

Time required: 8 to 9 days.

4. In conclusion the author recommends carrying out magnetmetric investigations of gold placer deposits in a series of regions in the U.S.S.R.

--W. Ayvazoglou.

3. SEISMIC METHODS

(1508) DIE GENAUIGKEIT VON SEISMOGRAPHISCHEN MESSUNGEN NICHTSTATIONÄRER VORGÄNGE

(THE ACCURACY OF SEISMOGRAPHIC MEASUREMENTS OF UNSTEADY PROCESSES)

By H. W. Koch and W. Zeller

Zeitschrift für technische Physik, Leipzig, vol. 14, No. 4, 1933, pp. 162-165

The degree of the error in seismographic measurements of the unsteady processes is derived from the process of the oscillation occurring preliminary to the moment when this oscillation becomes steady (Einschwingvorgang).

From the results obtained, certain requirements for the construction and application of seismographs are derived.--Author's abstract translated by W. Ayvazoglou.

(1509) ÜBER OBERFLÄCHENWELLEN IN VISKOELASTISCHEN MEDIEN

(ON THE SURFACE WAVES IN THE VISCOELASTIC MEDIA)

By T. Itoo

Memoirs of the Faculty of Engineering, Kyushu Imperial University, Fukuoka, Japan, vol. 7, No. 1, 1933, 5 pp.

In order to give a theoretical foundation which includes the idea of the elasticity, as well as that of the viscoelasticity, the author introduces fundamental relations under the assumption of the existence of the dependency of the strains caused not only by the deformation but also by the velocities of the deformation.

Based on these fundamental relations the author derives wave-formulas for both viscoelastic media and elastic media.

Relation between the absorption constant and the viscoelastic constant is discussed.

Finally the author enumerates some results of various problems examined with regard to the surface waves in viscoelastic media.--W. Ayvazoglou.

(1510) ZUR SEISMIZITÄT DES MAINZER BECKENS UND SEINER RANDGEBIRGE

(CONCERNING THE SEISMISM OF THE BASIN OF MAINZ AND OF ITS BORDER MOUNTAINS)

By H. Landsberg

Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, No. 2, 1933, pp. 167-171

The earthquakes of Gross-Gerau from 1869 to 1871 were followed by a second seismic period, lasting from February to August, 1871. The 119 shocks of this period, the foci of which were situated at the border of the Odenwald, had shown a diurnal variation with a maximum during the night. Based on 109 maps of isoseists (lines of similar quake strength) of the quakes in the district of Mainz, in the Taunus and in the Odenwald, a map was drawn showing the seismic structure of this country.--Author's abstract.

(1511) GEOLOGY OF THE SOUTHERN CALIFORNIA EARTHQUAKE

By J. E. Eaton

Petroleum World, Los Angeles, vol. 30, No. 4, April 1933, pp. 13-14

The Long Beach (Calif.) earthquake of March 10, 1933, resulted from deep-seated horizontal movement (probably from 5 to 10 miles in depth) along a central part of the Newport-Beverly shear zone. More important fractures of this zone are mentioned.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(1512) GEOLOGICAL SURVEY BY MEANS OF ELECTRICITY

By T. Hatton and T. Ogimura

Extract from Report No. 1 of the Geological Investigation Commission, Japan, pp. 161-175

The article is in Japanese. The English abstract written by the authors reads as follows:

> When electric current flows out of two poles placed beneath the surface of the earth, the curve for voltage on the surface of the earth as well as the current flowing through the earth varies according to electric resistances of the strata forming the ground. So we can determine the electric resistance and the thickness of each stratum by measuring the voltage on the surface of the ground. The curve for voltage on the surface of the earth is affected in a rather complex way both by the ratio between the electric resistance of the strata and by their relative thickness. The present paper deals with

the method of distinguishing between the effects of these two causes which appear in the curve observed on the ground and determining thereby the electric resistance and the thickness of the strata.

In preparing the paper, the writers have referred to the method which was adopted by the engineers of the Electrical Prospecting Co. (Japan), who made an electric geological survey in some districts under the control of the Morioka and Yamaguchi Construction offices.

(1513) A NEW SIMPLE GEOPHYSICAL INSTRUMENT

(EDITORIAL NOTE)

Mining and Metallurgy, New York, vol. 14, No. 318, 1933, p. 285

A description of the "metallascope", a simple and portable geophysical instrument for locating vein conductors and conductive orebodies that lie close to the surface (not over 20 ft.) is given. The instrument was developed by Gerhard R. Fisher, who claims that the instrument has been used successfully by operators without a special training or knowledge of geophysical prospecting.

The instrument operates on the inductive principle and consists of a small transmitter and loop connected by means of two wooden carrying bars to a receiver and receiving loop. The receiver has four tubes, two stages of radio frequency, a detector, and an audio tube, similar to that used in a ship's radio compass. The receiver loop is contained in the receiver case. A pair of earphones is plugged into the receiver. The whole instrument weighs 22 pounds.--W. Ayvazoglou.

(1514) THE ELECTRICAL PROPERTIES OF SOIL FOR ALTERNATING CURRENTS AT RADIO FREQUENCIES

By R. L. Smith-Rose

Proceeding of the Royal Society, London, Series A, vol. 140, No. A-841, 1933, pp. 359-377

The application of a laboratory method for measuring the conductivity and dielectric constant of samples of soil taken from selected sites at the National Physical Laboratory, Teddington, is described. These measurements were made over a range of frequencies of from 1,000 cycles per second to 10 million cycles per second, and for various moisture contents ranging from practically zero up to a value exceeding that normally experienced for surface soil taken direct from the ground. The results of these measurements show that the conductivity varies from less than 10^5 e.s.u. (electrostatic units) for dry soil, up to a value of approximately 10^8 e.s.u. for normal moisture content. Corresponding values for the dielectric constant range from 2 to 3 for dry soil up to about 20 for moist soil at high radio frequencies.

The results of measurements made on a number of samples of soil taken at random from several other sites are included in the paper, and show that both the normal moisture content and the conductivity can have values which are appreciably higher than those experienced at Teddington.

The paper concludes with a brief discussion of the penetration of radio-frequency currents in the earth, and the effective depth of penetration has been calculated in some instances with the aid of the experimental values of conductivity and dielectric constant determined above.--Author's abstract.

5. RADIOACTIVE METHODS

(1515) A RESISTANCE-COUPLED AMPLIFIER FOR MEASURING IONIZATION CURRENTS

By L. F. Curtiss

Bureau of Standards Journal of Research, Washington, vol. 10, No. 5, 1933, pp. 583-389

A description is given of a simple two-stage resistance-coupled vacuum tube amplifier for use in measuring ionization currents down to the order of 10^{-13} ampere. Commercial dry-cell vacuum tubes are used. It can be calibrated and will retain its calibration over considerable periods within 1 percent. Where comparative measurements are required--for example, standardizing radium preparations--it is capable of a much higher accuracy. Readings are made on a pointer-type microammeter. The stability of the circuit indicates that a more sensitive instrument could be used if more feeble currents are to be measured. A description of interchangeable ionization chambers, suitable for use with such an amplifier is given.--Author's abstract.

(1516) SECONDARY EFFECTS IN IONIZATION BY HARD GAMMA RAYS

By E. J. Workman

The Physical Review, Lancaster, Pa., vol. 43, No. 11, 1933, pp. 859-870

The observations presented in this paper show that the ionization produced in a counting chamber by gamma rays from a given source depends in a complicated way upon (a) the nature (atomic) and thickness of the walls of the chamber; (b) the nature, amount, and distribution of matter in the neighborhood of the chamber. When the walls are sufficiently thick to stop the secondary beta particles (the actual effective ionizing agencies) the secondary influences from the outside are greatly reduced, and the uncertainties involved among measurements with different thicknesses of the same wall material may be no more than a few percent. The results emphasize the effects of nuclear scattering of the secondary beta particles. This action is effective in any material from which beta rays may pass to the gas of the chamber, and consequently the atomic properties of any such materials must be considered in interpreting ionization measurements.

The following effects of nuclear scattering are discussed in their relation to ionization measurements: (1) equilibrium conditions between primary and secondary radiation with attention to the effect of "filtering"; (2) reflection of the secondaries by the wall material; (3) the dependence of the "stopping power" for electrons, of the wall on the atomic number of the material. In the second part of the paper, the front and back wall effects are treated separately. Transition effects between different materials on the front wall are shown. These transition curves are discussed in connection with "stopping power" equilibrium conditions, and photoelectric conversion of the gamma radiation. The bearing of these phenomena on measurements of gamma radiation with different counting chambers is discussed.--Author's abstract.

6. GEOTHERMAL METHODS

(1517) TAKE TEMPERATURE OF WELL IN JACKSON GAS AREA

(Editorial Note)

The Oil Weekly, Houston, vol. 69, No. 13, 1933, p. 61

The article gives the readings taken recently by Dr. C. E. Van Orstrand in a well in the Jackson (Miss.) gas field, which had gone dead.

The well is Cleve Love et al's Muse-Cotton 1, located 1,360 feet north and 770 feet west center, section 14-5n-1e, Rankin County, southeast part of the field, which is practically on top of the Jackson igneous plug and apex of the magnetometer high. The temperature readings were as follows:

Feet	°F.	Feet	°F.
100	66.4	1,250	99.5
250	70.8	1,500	106.6
500	78.1	1,750	113.7
750	84.2	2,000	120.6
1,000	93.1	2,250	126.7

(1518) SOME COMMENTS ON THE MEASUREMENT AND INTERPRETATION OF DEEP-EARTH TEMPERATURES

By C. E. Van Orstrand

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, vol. 3, No. 3, 1933, pp. 261-281

A brief description is given of the apparatus used by the United States Geological Survey and the American Petroleum Institute in conducting recent geothermal surveys.

As a result of tests in 700 wells located chiefly in producing oil fields, instances have been found in which the isogeothermal surfaces rise in passing over salt domes, faults, sand lenses, and structures of large and small closure. In central Oklahoma, there is in addition to the local variations a regional variation that seems to be determined largely by the depth to the granite. --Author's abstract.

7. UNCLASSIFIED METHODS

(1519) EINIGES AUS DEN WISSENSCHAFTLICHEN ERGEBNISSEN DER DEUTSCHEN GRÖNLAND-EXPEDITION ALFRED WEGENER

(SOME REMARKS CONCERNING THE SCIENTIFIC RESULTS OF THE ALFRED WEGENER'S GERMAN GREENLAND EXPEDITION)

By Kurt Wegener

Die Naturwissenschaften, Berlin, Vol. 21, No. 5/6/7, 1933, pp. 111-115

In this article the author discusses briefly the results of Alfred Wegener's expedition with regard to (1) meteorology, (2) geodesy, and (3) seismology and glaciology.--W. Ayvazoglou.

(1520) SCIENTIFIC RESEARCH WORK IN THE DOMAIN OF APPLIED GEOPHYSICS (IN RUSSIAN)

By Sofronov

Vestnik of the United Geological and Prospecting Service of the U.S.S.R., vol. 6, No. 5-6, 1931, pp. 41-47

After a brief historical outline of the development of applied geophysics, the author discusses the purpose and problems of the scientific research work in this domain. The following conclusions are drawn:

1. Geological prospecting methods of applied geophysics will undoubtedly develop in the future.

2. The development of these methods is based on scientific research work.

3. Successful scientific research work depends on close cooperation with geological prospecting work.

4. The highest results of the scientific research work in the applied geophysics in the U.S.S.R. will be obtained if this work is concentrated in one center and if it is carried on in connection with geological prospecting. --W. Ayvazoglou.

(1521) DEPENDENCE OF GEOPHYSICAL SURVEYS CARRIED OUT BY THE GEOPHYSICAL INSTITUTE ON THE MEANS OF TRANSPORTATION (IN RUSSIAN)

By N. N. Samsonov and M. Ratner

Vestnik of the United Geological and Prospecting Service of the U.S.S.R., vol. 6, No. 5/6, 1931, pp. 58-61

The authors describe some difficulties arising from transportation of the personnel and the instruments for geological surveys in the U.S.S.R. Owing to these difficulties the cost of geophysical prospecting is sometimes increased 30 percent.--W. Ayvazoglou.

9. NEW BOOKS

(1522) Ackerl, Franz. Die Schwerkraft am Geoid (Gravitation on the Geoid). Sitzungsberichte der Akademie der Wissenschaften in Wien. Abt. 11a, Bd. 141, Heft 5-7, 1932. The author has assembled all gravity measurements carried out so far by the pendulum apparatus, including Vening-Meinesz measurements made in submarine boats.

(1523) Burmeister, F. Erdmagnetische Vermessungen in der Rheinpfalz nebst einem Anhang: Geologische Deutungsversuche von O. M. Reis. Earthmagnetic Measurements in the Rhine Palatinate With an Annex: Attempted Geologic Interpretation by O. M. Reis. Veröffentlichungen der Erdphysikalischen Warte bei der Sternwarte München, issued by A. Wilkens, No. 6, Munich, 1932, Verlag der Bayerischen Akademie der Wissenschaften. A review of the book is given by Hopfner in the Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, No. 3/4, 1933, pp. 432-433.

(1524) Hopfner, Prof. Dr. F. Physikalische Geodäsie (Physical Geodesy). Vienna, 1932, 434 pp., 49 figs. Price: about 28 R. M., Akademische Verlagsgesellschaft m.b.H., Leipzig. The book will be available in the near future.

(1525) Institution of Petroleum Technologists, Symposium in Salt Domes. London, 132 pp., 12 figs., 3 plates, 8 maps, Price: 10 s. 6d. This symposium contains papers by James Romanes, G. M. Lees, F. G. Clapp, J. V. Harrison, Arthur Wade, E. deGolyer, Launcelot Owen, Murray Stuart, Harold Dabell, Karl Sundberg, and Carl Schmidt. The collection of papers deals with the salt domes of Germany, Egypt, the coast of the Gulf of Mexico, Asia Minor, and Persia. There are included articles on the physics and chemistry of these structures.

(1526) Oil Geological and Prospecting Institute, Report on the Conditions and Work During 1931 (in Russian). Issued by the Government Scientific-Technical Oil Department, Leningrad and Moscow, 1933, 111 pp., 8 maps; price 7 roubles. The report mentions the geophysical work carried out and the methods applied in the U.S.S.R. during 1931 in the following regions of the country:

Azerbaijan: Gravimetrical, pendulum, magnetic, and electrical methods. The whole area covered by the geophysical exploration was 420 km^2.

North Caucasus: Electrical methods and electrical coring.

Dagestan: Gravimetrical method. 478 stations were covered.

Central Volga: Magnetic methods. Observations were made at 1,715 points. The area investigated was about 35,000 km^2. A series of anomalous regions with a maximum of about 3,000 near the city of Bugulma, were established.

Nishni-Novgorod district: Pendulum measurements were made along the railroad Kotelnich-Perm., Gravimetrical prospecting along the Volga between Boldin and Kazan.

Urals: Seismic methods in the region of the Verhne-Chusovski Gorodki. Magnetic methods along the western slope of the Urals; total area of investigation, 35,000 km^2; number of station, 1,526.

Bashkir Republic: Magnetic methods. Total area investigated about 40,000 km^2; number of stations, 1,896. Local anomalies of about 4,000 were established near the city of Sterlitamak.

Pendulum observations were made in the region of Sterlitamak-Belebey.

Northern Emba: Gravimetrical methods, pendulum observations and seismic methods.

Southern Emba: Radioactive methods, gravimetrical methods, electrical methods.

Uzbek Republic: Electrical methods, gravimetrical method, (180 stations).

The results of the investigations are briefly described and the steps to be taken for conducting geophysical exploration of the country in the future are considered.--W. Ayvazoglou.

(1527) Tams, E. Grundzüge der physikalischen Verhältnisse der festen Erde, ihre Beziehungen zur geologischen Gestaltung des Erdantiltzes. (Principles of physical conditions of the solid earth and their relations to the geological structure of the earth's crust.) Part I: Size, form, and structure of the earth, its thermal and gravimetric relations. 184 pp., 4 tables, 13 figs., Berlin, 1932. Issued by the author. A review of the book is given by V. Conrad in the Gerlands Beiträge zur Geophysik, Leipzig, vol. 38, No. 2, 1933, p. 263.

(1528) Winchester, D. E. The Oil and Gas Resources of New Mexico, New Mexico School of Mines, State Bureau of Mines and Mineral Resources, Bull. 9, p. 223; 33 plates, 11 figs., Socorro, N. Mex., 1933. Price $1.50. Information on the developed oil and gas resources of New Mexico is assembled, and the possibility of finding undiscovered oil and gas pools is briefly discussed. The stratigraphy and structure of the State are described; a generalized geologic map of the State is given, as well as an oil and gas map on which the proved fields and the location of some 200 anticlinal structures are shown.

10. PATENTS

(1529) SEISMIC METHOD OF PROFILING GEOLOGIC FORMATIONS

(Burton McCollum, of Houston, Tex., assignor, by mesne assignments,
to the Texas Co., a corporation of Delaware)

U. S. Patent 1,909,205 Patent issued May 16, 1933.

This invention relates to the art of determining the shape of seismic wave fronts in a subterranean substance, the method consisting in producing seismic waves, detecting the arrivals of the waves at points in a substantially vertical line therein, producing seismic waves to pass substantially vertically through said points, detecting the arrivals of the second mentioned waves at said points, and locating points on a wave front at the time it reaches one of said points.

Claims allowed - 11.

(1530) ELECTRODE FOR GEOPHYSICAL SURVEYS

Magne Mortenson, of Trondhjem, Norway

U. S. Patent 1,910,709 Patent issued May 23, 1933.

The present invention relates to an electrode for electrical measurements or the like comprising a porous container, the porosity of which decreases from the interior toward the exterior, a solution of metal salt in said container, and a metal member mounted in said solution.

Claims allowed - 10.

(1531) METHOD AND APPARATUS FOR GEOPHYSICAL EXPLORATION

Ludwig, W. Blau, of Houston, Tex., assignor to Standard
Oil Development Co., a corporation of Delaware.

U. S. Patent 1,911,137 Patent issued May 23, 1933.

This invention relates to improvements in methods and apparatus for determining the presence of valuable minerals, oil, and other subterranean deposits. The invention comprises the use of a direct electrical current passing between electrodes embedded in the surface of the earth. The characteristics of this current as modified by its passage through intervening strata are measured and recorded at a plurality of points.

Claims allowed - 7.

(1532) METHOD OF DETERMINING THE DIRECTION OF ALTERNATING GROUND FIELDS

Erik Helmer Hedstrom, of Houston, Tex., and Theodor Zuschlag,
of New York, N. Y., assignors to Swedish American Prospect-
ing Corporation, of New York, N. Y., a corporation
of New York.

S. Patent 1,912,036 Patent issued May 30, 1933.

This invention relates to electrical prospecting by means of artificially duced alternating-current ground fields, and has for its object the provi- on of a method and apparatus enabling the attainment of various new and proved results.

Claims allowed - 9.

(1533) ELECTRICAL PROCESS FOR THE GEOLOGICAL INVESTIGATION OF THE POROUS STRATA TRAVERSED BY DRILL HOLES

Conrad Schlumberger, of Paris, France

S. Patent 1,913,293 Patent issued June 6, 1933.

This invention relates to an electrical process for the geological investi- tion of the porous strata traversed by a drill hole, consisting in filling e hole with water or mud, and measuring in this fluid at various depths in e uncased part of the hole the differences of potential which spontaneously ke place at the contact between the porous strata and said fluid.

Claims allowed - 3.

(1534) IMPROVEMENTS IN APPARATUS FOR RECORDING DISTANCES OR DEPTHS BY THE ECHO-SOUNDING METHOD

Submarine Signal Co., a corporation organized under the State
of Maine, of 160 State Street, Boston, Mass., U. S. A.

Assignees of Edwin E. Turner, Jr., and Ralph E. Bates, both
citizens of the U. S. A.

ritish Patent 388,567 Patent issued March 2, 1933.

This invention relates to apparatus for recording distance or depth easurements, such as the height of aircraft from the ground or the depth of ater beneath a vessel, by the echo-sounding method.

Claims allowed - 12.

(1535) PENDEL, INSBESONDERE FÜR SCHWEREMESSUNGEN

(PENDULUM, ESPECIALLY FOR GRAVITY MEASUREMENTS)

Firma Carl Zeiss of Jena.

German Patent 571,680 Patent issued March 3, 1933.

This invention relates to a pendulum, especially for gravity measurements, provided with adjustment screws, the axes of which are situated in a plane parallel to the knife-edge of the pendulum. The desired adjustment is accomplished by the choice of screw length.

Claims allowed - 5.

(1536) ARRETIERVORRICHTUNG FÜR MAGNETISCHE WAAGEN MIT DREIFACHER AUFLAGE DES SYSTEMS

(LOCKING DEVICE FOR MAGNETIC BALANCES WITH A THREEFOLD APPLICATION OF THE SYSTEM)

Hauser & Co., G.m.b.H. of Augsburg

German Patent 572,094 Patent issued March 10, 1933.

The present invention relates to a locking device for magnetic balances and is characterized by the arrangement in which two of the three points of application of the locking system are situated in planes perpendicular to the knife-edge and the third point in a plane parallel to the knife-edge.

Claims allowed - 3.

(1537) ABLESEVORRICHTUNG FÜR MIT SPIEGEL VERSEHENE SYSTEME, VORZUGSWEISE VON MAGNETISCHEN WAAGEN

(READING DEVICE FOR SYSTEMS PROVIDED WITH MIRROR, ESPECIALLY THOSE USED IN MAGNETIC BALANCES)

Hauser & Co., G.m.b.H. of Augsburg, and Johannes B. Ostermeier of Mering

German Patent 573,235 Patent issued March 30, 1933.

The present invention relates to the systems of reading devices, especially those used in magnetic balances, which are provided with mirrors, are swinging about a horizontal axis, and consist of two optical systems of which one has an objective scale and the other represents the real image of the objective scale after its reflection from the mirror surface of the swinging system. The systems are characterized by an arrangement in which the optical axes of the two optical systems form one with another an angle.

Claims allowed - 1.

(1538) VORRICHTUNG ZUR TEMPERATURKOMPENSATION AN MAGNETSYSTEMEN FÜR MAGNETISCHE WAAGEN

(A DEVICE FOR TEMPERATURE COMPENSATION OF MAGNETIC SYSTEMS USED IN MAGNETIC BALANCES)

Hauser & Co., G.m.b.H. of Augsburg

erman Patent 573,236 Patent issued May 24, 1933.

The device for temperature compensation of magnetic systems used in mag- etic balances with lamellae-shaped magnetic bodies, to which this invention elates, is characterized by the fastening of the elongated lamella-shaped odies, the coefficient of extension of which is different from that of the agnetic body, to the magnet-lamellae in such a way that the center of gravity f the compensation bodies is situated entirely, or almost entirely, on the otation axis, or above or below the center of gravity on a line perpendicular o this axis.

Claims allowed - 2.

(1539) MAGNETSYSTEM FÜR MAGNETISCHE WAAGEN

(MAGNETIC SYSTEM FOR MAGNETIC BALANCES)

Hauser & Co., G.m.b.H. of Augsburg)

erman Patent 573,474 Patent issued May 24, 1933.

The present invention relates to a magnetic system for magnetic balances onsisting of two magnet-lamellae fastened to a central body, the latter eing provided with a knife-edge. According to this invention the magnet- amellae are fastened to the central body at one point near or at the center f gravity of the magnet-lamellae.

Claims allowed - 1.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1540) ÜBER DIE MESSUNG DER ZEITLICHEN SCHWANKUNGEN DER SCHWEREBESCHLEUNIGUNG MIT GRAVIMETERN

(ON THE MEASUREMENT OF THE TEMPORAL VARIATIONS OF GRAVITY ACCELERATION WITH GRAVIMETERS)

By R. Tomaschek and W. Schaffernicht

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 3, 1933, pp. 125-136.

Practical principles for the arrangement of two types of gravimeters and the results obtained by the use of them are discussed. The change of the length of a spiral spring is measured, in the case of the so-called interference-gravimeter, by shifting the interference strip. The other type represents an improved bifilar gravimeter. The outside disturbances are avoided by working in a hermetically closed room and by using the WT 10-spirals. Records of gravity variations equal up to 0.001 milligal (0.01 milligal in case of the interference gravimeter) were obtained.

The interpretation of a series of measurements made during three months is given.--Authors' abstract translated by W. Ayvazoglou.

(1541) STÖRUNGEN VON PENDELUHREN DURCH BODENERSCHÜTTERUNGEN

(DISTURBANCES OF PENDULUM-CLOCKS CAUSED BY OSCILLATIONS OF THE GROUND)

By Hans Gebelein

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 3, 1933, pp. 137-145.

The movement of a pendulum is influenced by the disturbances of the point of suspension in three ways: (1) The amplitude is changed, thus affecting the time of oscillation; (2) the phase of oscillation is changed; and (3) the time of oscillation is changed directly during the period of the disturbance. The author examines these effects in connection with the disturbance, as each of these effects can under circumstances obtain a value which necessarily must be taken into consideration. The results are discussed on an example carried out under the conditions existing in the observatory of the University of Göttingen.--Author's abstract translated by W. Ayvazoglou.

(1542) MAPPING OF FAULTS BY ISOGAMS

By Raoul Vajk

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 3, 1933, pp. 151-156.

The author gives a method for mapping faults by isogams which is similar to the way in which they are mapped by level lines. The method is as follows: The isogams are constructed after the gravity effect of the fault is eliminated from the observed gradients. The values of the isogam lines are raised on the upthrown side of the fault with a certain $\triangle g$ value determined from the gravity curves.--Author's abstract.

(1543) MESURES DE GRAVITE FAITES AU MOYEN DE L'APPAREIL HOLWECK-LEJAY NO. 2

(GRAVITY MEASUREMENTS BY MEANS OF HOLWECK-LEJAY'S NO. 2 APPARATUS)

By R. Goudey

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 26 (June 26), 1933, pp. 1967-1968.

In the course of 1932 the author carried out in the Franche-Comté a series of measurements of "g" by means of Holweck-Lejay's No. 2 apparatus. The methods of observation and of calculation were the same as described in a previous article (see Geophys. Abs. 40, p. 529). The results obtained are given in a table.--W. Ayvazoglou.

2. MAGNETIC METHODS

(1544) CONTRIBUTION TO THE THEORY OF THE MAGNETOMETRIC SURVEY (IN RUSSIAN)

By D. V. Frost

Memoirs of the Russian Scientific Institute in Belgrade, Belgrade, no. 6, 1932, pp. 87-134.

The purpose of the present paper is to show that in the case of weakly magnetized deposits,--that is, when the inductive influence of the terrestrial magnetism must also be taken into consideration, thus making theoretical investigation more complicated,--it is still possible to establish rules for determining the location of the deposit. A mathematical discussion of the question is given, and formulas for the effect of a homogeneous magnetic ellipsoid of rotation are derived.--W. Ayvazoglou.

(1545) WEST WITS -- PROGRESS REPORT

Editorial note

The South African Mining and Engineering Journal, Johannesburg, vol. 44, no. 2149, 1933, p. 180.

The systematic manner in which the "gold fields" engineers and geologists are opening up and testing the West Witwatersrand areas is shown by the quarterly report of this company. With regard to geophysical work, the report shows that since the formation of the company (1932) detailed magnetometrical traverses, entailing 93 miles of traverse and observation at more than 8,000 stations, have been carried out by Dr. Krahmann and a staff of assistants under his direction. General geological and topographical surveys were carried out under the direction of Dr. Reinecke, and an area of approximately 60 square miles has been mapped and contoured. The augmented staff in the field under Drs. Reinecke and Krahmann now includes 11 men specially trained in geological and geophysical work.--W. Ayvazoglou.

(1546) ANOTHER TRANSVAAL GOLD FIELD?

Editorial note

The Mining and Industrial Magazine of Southern Africa, Johannesburg, vol. 16, no. 8, 1933, p. 299.

The article contains information on the creation of a new company, Far East Rand Areas ("A" Company), Ltd., which expects to start a thorough investigation by geophysical prospecting methods of an area of approximately 100,000 English acres in the Bethal district of the Transvaal.

A magnetometric survey will in the first instance be conducted.--W. Ayvazoglou.

(1547) UN APPAREIL POUR DETERMINER LES PROPRIÉTÉS MAGNÉTIQUES DES ROCHES

(AN APPARATUS FOR DETERMINING MAGNETIC PROPERTIES OF ROCKS)

By G. Grenet

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 12 (March 20), 1933, pp. 874-875.

In constructing an apparatus for determining magnetic properties of rocks, Grenet utilized a method of induction in such a manner that it was not necessary to take into consideration either the form or the heterogeneity of the samples. A description of the apparatus and of the method of its operation and calibration is given. Possibilities of improvements are mentioned.--W. Ayvazoglou.

(1548) SUR L'INTERVALLE DE TEMPS ENTRE LES PHÉNOMÈNES SOLAIRES ET LES PERTURBATIONS MAGNÉTIQUES TERRESTRES

(CONCERNING THE INTERVAL OF TIME BETWEEN SOLAR PHENOMENA AND TERRESTRIAL MAGNETIC DISTURBANCES

By Ch. Maurain

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 17
(April 24), 1933, pp. 1182-1186.

The author examines the existence of the interval of time between solar phenomena and terrestrial magnetic disturbances based on statistical data since 1883. Historical summary of works published on this subject is given. --W. Ayvazoglou.

(1549) MESURES MAGNÉTIQUES EN SYRIE

(MAGNETIC MEASUREMENTS IN SYRIA)

By Jean Chevrier

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 19
(May 8), 1933, pp. 1428-1429.

The observations were carried out at 24 stations. A theodolite compass, Brunner-Chasselon model no. 3, and an inclination needle, Chasselon model no. 1, were used. The values of declination were reduced to 1933,0.

In Kamechlié, Rakka, and Souar the measurements were made at the same stations used in 1930 (see Geophys. Abs. 28, p. 198) so that the secular variation of the declination during 1931 and 1932 could be calculated. The results of measurements are shown in a table.--W. Ayvazoglou.

(1550) VARIATION DE LA COMPOSANTE HORIZONTAL AUTOUR DES JOURNÉES DE CALME MAGNÉTIQUE

(THE VARIATION OF THE HORIZONTAL COMPONENT ROUND ABOUT DAYS OF MAGNETIC CALM

By L. Eblé

Comptes Rendus de l'Académie des Sciences, Paris, vol. 196, no. 19
(May 8), 1933, pp. 1429-1431.

For studying terrestrial magnetism, especially with regard to the diurnal variation, it is necessary to take into consideration the days of magnetic calm. The author describes his observations based on the data obtained from Val-Joyeux (Seine-et-Oise); the mean value of the variations, expressed in γ, are given.--W. Ayvazoglou.

(1551) DAS MAGNETISCHE VERHALTEN DER DIABASE DES NORDWESTLICHEN HARZES

(THE MAGNETIC REACTION OF THE DIABASE ROCKS OF THE NORTHWESTERN HARZ)

By Gerhard Beyer

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, no. 3, 1933, pp. 337-363.

The author observed the anomalies of the vertical intensity of the earth magnetic field above the diabase rocks in the northwestern part of the Harz Mountains in continuation of a study-measurement by Rössinger and Puzicha published in the same journal (see Geophys. Abs. 46, p. 734).

The diabase rocks of the middle Devonian Wissenbacher Schiefer series showed no magnetic anomalies. The diabase rocks of the uppermost Devonian and lowest Carboniferous (Kulm) in the northwestern part of the so-called "Oberharzer Diabaszug" did not display any disturbance. Contrary to this the diabase rocks of the same age which are located along the Bruchberg-Acker have magnetic disturbances which are very similar to those found by the investigation of the "Fleckendiabase" of the "Oberharzer Diabaszug."

The magnetic disturbances are caused by magnetite which is contained within the diabase and which was proved by chalcographic and physical-magnetic analysis. Above the overthrusts, which exist in the area between these two regions, magnetic indications could not be obtained.--Author's abstract.

(1552) GEBIRGSBAU UND ERDMAGNETISMUS IN BÖHMISCHER MASSE UND OSTALPEN

(STRUCTURE AND TERRESTRIAL MAGNETISM OF THE BOHEMIAN MASS AND THE EASTERN ALPS)

By Robert Swinner

Gerlands Beiträge zur Geophysik, Leipzig, vol. 39, no. 1, 1933, pp. 58-81.

According to the developments given in the introduction, the explanation of the magnetic declination must be deducted from the rule: A district having greater magnetic susceptibility than its surroundings produces a positive anomaly of the declination, which seems to be displaced to the south (and east) with regard to the disturbing district; a smaller susceptibility produces a negative anomaly displaced to the north (and west).

In the territory described in this treatise (Bohemia, Moravia, and the eastern part of Austria) the anomalies of the declination are forming large groups of the same sign, which are always corresponding to the large unities of the geologic structure, that is: (1) The Tertiary basin of the Middle-Styria, negative; (2) the "March"-depression of Olmütz downwards and farther across the Danube as far as Wiener-Neustadt, positive; (3) the coal district f Ostrau and the depression of the Oder, negative; (4) the crystalline complex of southern Moravia and the Waldviertel (as far as the line of the Isper), ncluding in the south the calcareous Alps of Lower Austria (Lunz-Gresten-Shelfplateau) in northwestern direction as far as the bend of the Elbe at olin and straight to the north-northeast across the mountains of Glatz to the dge of the mountains, negative; (5) the crystalline belt between the Upper ustrian and Middle Bohemian granitic masses, including both, continuing in he south across Upper Austria (high positive values in the lake district) and he "Altkristallin" of Styria and Carinthia, in northern direction as far as he Riesengebirge, with lobes to the east in the Eisengebirge and to the Switschin mountain, positive; (6) Eisenstein-southeastern (Silurian) half of he Barranduim-Reichenberg-Görlitz, negative; (7) the highland of Tepl-orthwestern (Algonkian) half of Barrandium, negative, (granite of the Lausitz), positive; (8) Erzgebirge and annexed to it the volcano of Duppau and the volcanic Bohemian Mittelgebirge, negative; (9) Tauern with the neighboring districts in the north and the south (transverse zone striking in the Hercynian direction), negative.

Consequently Austria eastward from the Katschberg appears as an appendix of the Bohemian mass, a connection which has been confirmed by all the geophysical data (measurements of gravity, seismic observations) and observations on the rocks as well as the tectonic of the fundamental complex. The transverse zone of the Tauern represents a part of that varistic chain which is also asserted in Lower Bavaria, forming the connection between the palaeozoic zone of the Eastern Alps to the Barrandium.

In general it is striking that geologic bodies of different composition have the same reaction with regard to the terrestrial magnetism whilst others of apparently the same composition have a different one. Thus the Tertiary and Quarternary depressions show on the one hand a negative and on the other hand a positive anomaly. As in other cases the magnetic conditions can also be only partly explained by the rocks at the surface (and especially not by its content of magnetite), one must suppose that reactions from the deeper regions of the mountains are exerting their influence.--Author's abstract.

(1553) NUOVA ESPLORAZIONE GEOFISICA DELLA SICILLA. RISULTATI GENERALI E CENNI PARTICOLARI SULLE DETERMINAZIONI GEOMAGNETICHE

(NEW GEOPHYSICAL EXPLORATIONS IN SICILY. GENERAL RESULTS AND PARTICULAR FEATURES CONCERNING GEOMAGNETIC DETERMINATIONS)

By R. Fabiani and G. Petrucci

Rediconti della R. Accademia Nazionale dei Lincei, Rome, vol. 17, series 6a, no. 9, 1933, pp. 686-691.

The article consists of two parts. In the first Fabiani gives instructive rules based on preliminary results of the new exploration in Sicily with regard to the geological structure; in the second Petrucci gives data on geomagnetic determinations at various places.--W. Ayvazoglou.

(1554) RELAZIONE SULL ESPLORAZIONE GEOFISICA REGIONALE DELLA SICILIA ESEGUITA NEL TRIENNIO 1929-1931

(CONCERNING GEOPHYSICAL EXPLORATION IN SICILY CARRIED OUT DURING THE THREE YEARS 1929-1931)

By Ramiro Fabiani

Bollettino dell' Associazione Mineraria Siciliana, vol. 8, no. 5-8, 1932, 14 pp.

In this article the author describes the process of the work and the results obtained from observations made at 122 gravimetrical stations and 670 geomagnetic stations. The results are shown in respective maps of the isanomalies.--W. Ayvazoglou.

(1555) PROBLEMS IN THE GEOLOGIC INTERPRETATION OF THE EARTH'S MAJOR MAGNETIC ANOMALIES

By W. P. Jenny

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 38, no. 2, 1933, pp. 97-105.

The writer assumes that the magnetic field along the earth's surface would correspond mainly to the field of a magnetized sphere and that the magnetic axis of this sphere would coincide with the rotational axis, if it were not for the varying chemism and the tectonic dislocation within the magma zone and rock zone of the earth. From the total earth's magnetic field is deducted an inner portion. The remaining field contains major, continental, regional, and local anomalies, which are classified first theoretically and second empirically. The empirical major anomalies are represented in the form of magnetic vectors. The main high and low magnetic trends as indicated by these vectors show a striking parallelism with the main trends of the alpine orogeny. The small secular variations of the declination of the circum-Pacific stations as compared with circum-Atlantic stations are explained by the general conception that the basement of the Pacific is more stable than the basement of the Atlantic.--Author's abstract.

(1556) DIFFERENCES IN DIURNAL VARIATION OF VERTICAL MAGNETIC INTENSITY IN SOUTHERN CALIFORNIA

By Joshua L. Soske

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 38, no. 2, 1933, pp. 109-115.

In this paper the author gives the results of an experimental investigation of the diurnal variation in the intensity of the vertical component of the earth's magnetic field in the northern half of Southern California, and discusses the effect which the diurnal variation may have in the results of magnetic investigations of geologic features in this region. The apparatus and procedure are described and the data obtained are discussed.--W. Ayvazoglou.

(1557) A NEW APPARATUS FOR THE MEASUREMENT OF THE EARTH'S MAGNETIC FIELD

By L. F. Bates

Proceedings of the Physical Society, London,
vol. 45, no. 247, 1933, pp. 180-195.

A new method for the determination of the horizontal and vertical components of the earth's magnetic field is described. A small cylinder of mu-metal is wound with fine wire whose ends are connected to wires forming a torsional suspension. This cylinder is placed with its center at the midpoint of a Helmholtz coil system whose axis is adjusted to coincide with the direction of the component of the earth's field which is to be measured, the suspension being perpendicular to the component. The current through the coil system can be adjusted so that there is no deflection of the suspended cylinder when the current in the solenoid wound about it is reversed, in which case the calculated field produced by the coils is equal to the required component. The sources of error peculiar to the method are examined and their elimination is discussed. It is shown that measurements of high accuracy are possible.--Abstract reprinted from Terrestrial Magnetism and Atmospheric Electricity, vol. 38, no. 2, 1933, p. 155.

3. SEISMIC METHODS

(1558) BEITRAG ZUM THEMA: SEISMISCHE BODENUNRUHE

(CONTRIBUTION TO THE THEME: THE SEISMIC DISTURBANCE OF THE GROUND)

By H. Landsberg

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 3, 1933, pp. 156-161.

The author examines in this article a series of recent works dealing with questions arising from the fact that the periods and amplitudes of the disturbed waves appear in diagrams as measurable values of the seismic disturbance of the ground, and that the final results of observations are influenced by manifold causes affecting the origin and the spreading of elastic waves. A list of selected literature is added.--W. Ayvazoglou.

(1559) EARTHQUAKE NOTES

Edited by R. R. Bodle

Eastern Section, Seismological Society of America, Washington, D. C.,
vol. 4, no. 1/2, 1932, 15 pp.

This volume of the records of the Seismological Society includes abstracts of the proceedings of its meeting held in Philadelphia on May 3, 1932.

Abstracts of the following papers are given: (1) The Recent Earthquake Near Santiago de Cuba, by Stephen Taber; (2) Travel-Time Curves of the Santiago

Earthquake, by Frank Neumann; (3) Earthquakes of the Past Year, by Joseph Lynch; (4) The Determination of Accurate Time of Large Explosion, by E. W. Eickelberg; (5) A Study of Phases on Explosion Records, by L. Don Leet; (6) The Deep-Focus Japanese Earthquake of March 29, 1928, by V. C. Stechschulte; (7) Depth Changes in Sagami Bay After the Great Japanese Earthquake, by Francis P. Shepard; (8) Some Aspects of Group Periodicities in the Maxima of Surface Waves; (9) The Seismological Station at the Huancayo Magnetic Observatory in Peru, by J. A. Fleming; (10) The San Juan, Porto Rico, Seismological Station of the U. S. Coast and Geodetic Survey, by Eoline R. Hand; (11) Installation of McComb-Romberg Tilt-Compensation, Horizontal-Component Seismometers at the International Latitude Observatory, Ukiah, California, by H. G. Wrocklage; (12) Experiments With Two New Types of Tiltmeters, by George Meritt; (13) Response and Memory Characteristic of Seismometers, by Frank Wenner; (14) Magnification of the Wenner Seismometer, by R. C. Robinson; (15) Analyses of Rates of Rotation of Recording Drums, by H. E. McComb and A. Blake; (16) Development of Strong-Motion Seismographs, by H. E. McComb; (17) Theory of a New Strong-Motion Seismograph, by Maurice Ewing; (18) The Recording of Strong Seismic Motion, by A. Blake; (19) A Strong-Motion Seismograph for Earthquake, with Demonstration Model, by Arthur J. Weed; and (20) An Experimental Accelerometer, by Frank Neumann.

(1560) ÜBER DIE SEISMISCHE REFLEXIONSMETHODE

(ON THE SEISMIC REFLECTION METHOD)

By C. A. Heiland

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, no. 3, 1933, pp. 282-336.

According to the author, the quantity of oil produced thus far from seismic salt-dome discoveries on the Gulf coast more than pays for the cost of all geophysical work. The seismic methods in general have the advantage of depth control over other (gravimetric and magnetic) methods; the virtues of the reflection method in particular are: (1) Contrary to refraction methods, a favorable ratio of formation thickness to depth is not required; (2) the depth range in many cases is greater than can now be profitably reached by the drill; (3) the quantities of explosives required are exceedingly small; (4) the computations are easy; and (5) the interpretation is direct and definite, given in absolute depth, as required by the geologist. Early attempts to utilize marine echo-sounding methods for geologic purposes date back to 1913, but it was not until 1928 that the method was applied on a commercial scale. In operation, the reflection method is less expensive than the refraction method.

Contents of the article: (1) Introduction; (2) historical outline; (3) commercial viewpoints; (4) physical foundations; (5) problems arising in recording the reflections; (6) general constructive principles of the apparatus used; (7) the Colorado School of Mines apparatus; (8) application in the field; (9) identification of the reflections in the seismograms; (10) calculation of e results; corrections; sources of errors; (11) geological application; (12) xample; (13) possibilities of application at the northern German plain. A bliography and a list of patents are added.--W. Ayvazoglou.

(1561) THE ELASTIC CONSTANTS OF ROCKS AND THEIR RELATION TO SEISMIC WAVE SPEEDS

By W. A. Zisman

The Physical Review, Lancaster, Pa., vol. 43, no. 6, 1933, pp. 501-502.

Zisman's abstract of his paper in this number of the Physical Review eads as follows:

> Previous comparisons between the elastic constants of rocks determined statically and those computed by applying the theory of elastic waves to the seismically observed wave speeds had led to serious discrepancies. In attempting to clarify this situation, measurements were made on Young's modulus E, Poisson's ratio σ, and the compressibility x, of rocks taken from quarries in which Leet had measured the speeds of explosion waves. Discrepancies existing in already published values of E and σ were found to be due to neglect of previous experimenters to study the large changes in E and σ with the mean applied stress. Inconsistencies in the compressibility determinations of Adams and Williamson were shown to exist and suggest the presence of a 10 percent error in their methods. Their prediction of a rapid increase in compressibility with decreasing pressure was verified and shown to be caused by the porosity of rocks. It was also discovered that water contained in the rocks had an important influence upon the elastic constants, Leet's values of x for Quincy granite and for norite from Sudbury, Canada, agreed with our static measurements to within a few percent. These results are of fundamental importance to geophysicists, for they establish their right to apply the theory of elastic waves to the results of seismologists in order to determine from the wave speeds the values of E, σ, and x for that locality, and hence make it possible to identify the kind of rock existing there.

In connection with this, see also the following articles published by . A. Zisman in the Proceedings of the National Academy of Sciences, vol. 19, o. 7, 1933:

1. Young's modulus and Poisson's ratio with reference to geophysical applications (pp. 653-665).
2. Compressibility and anisotropy of rocks at and near the earth's surface (pp. 666-679).
3. Comparison of the statically and seismologically determined elastic constants of rocks (pp. 680-686).

--W. Ayvazoglou.

(1562) DEPTH CHANGES IN SAGAMI BAY DURING THE GREAT JAPANESE EARTHQUAKE

By Francis P. Shepard

The Journal of Geology, Chicago, vol. 41, no. 5, 1933, pp. 527-537.

The sources for the Japanese map showing large modifications of Sagami Bay after the great earthquake have been examined critically. Comparisons of the old and new soundings show that much of the evidence for these changes is of an uncertain character, but that there is good ground for believing that the floors of certain submarine valleys in the bay were decidedly deepened. Other less positive evidence suggests shoaling of one portion of a submarine valley.

The explanation of faulting as a cause of these modifications is unsatisfactory, since the large magnitude of the changes is quite out of keeping with those reported from the bordering lands or from earthquake areas in general. The alternative explanation of submarine landslides appears to account for the phenomena more satisfactorily.--Author's abstract.

4. ELECTRICAL METHODS

(1563) SOME OBSERVATIONS CONCERNING ELECTRICAL MEASUREMENTS IN ANISOTROPIC MEDIA, AND THEIR INTERPRETATION

By C. and M. Schlumberger and E. G. Leonardon

American Institute of Mining and Metallurgical Engineers,
Technical Publication No. 505, 1933, 25 pp.

In electrical prospecting it frequently occurs that the formations to be studied are stratified and decidedly anisotropic, and that an exhaustive knowledge of the laws governing the propagation of the current in anisotropic media is necessary for a satisfactory comprehension and interpretation of the results.

The laws of such propagation have been discussed, with special reference to the propagation due to a punctual source of current.

In order to account both for the properties of the honogeneous anisotropic rocks and for the anisotropy of a series of alternating layers, definition of a "microscopic", a "macroscopic", and a "total" anisotropy have been offered.

Some consequences of the electrical measurements in anisotropic terrains have been explained, and among them the "paradox of the anisotropy" by which the apparent transversal resistivity is smaller than the corresponding longitudinal determination.

Finally, a technique has been described by means of which it is possible, by induction measurements, to determine the direction of the dip of tilted anisotropic formations.--Author's abstract.

5. RADIOACTIVE METHODS

(1564) MESURES DE LA RADIATION COSMIQUE À L'AIDE D'UN NOUVEAU GENRE DU TUBE-COMPTEUR

(MEASUREMENTS OF COSMIC RADIATION BY MEANS OF A TUBE-COUNTER OF A NEW KIND

By L. Tuwim

Comptes Rendus de l'Académie des Sciences, Paris, vol. 197, no. 1,
(July 3), 1933, pp. 79-81.

In this article Tuwim gives a description of an improved tube-counter (see L. Tuwim, Comptes Rendus, vol. 196, 1933, p. 950). The instability of the tube-counter described in the previous article was corrected by covering the inner surface of the tube with a very thin layer of varnish (0.05 mm). The effect of cosmic rays upon the chemical elements and the principal properties of the new tube-counter are examined.--W. Ayvazoglou.

(1565) AN ESSAY OF METHODICS AND PROSPECTING OF THE RADIOACTIVE ORE DEPOSITS IN THE KARAMAZAR REGION, USBEKISTAN (IN RUSSIAN)

By B. N. Nasledov, V. J. Baranov, and P. T. Sokolov

Transactions of the United Geological and Prospecting Service of the U.S.S.R.,
Leningrad, no. 248, 1933, 82 pp.

The problems of the Karamazar party consisted of establishing the connection between the distribution of the radioactive elements and the geology and tectonics of the region. They were solved, according to the authors, satisfactorily by applying an aspiration apparatus for the testing of the radioactivity of samples and an apparatus for the measurement of the general radiation of the soil surface, together with a γ-electrometer.

The following number of measurements were made:

1. Laboratory measurements of radioactivity	763
2. Field measurements by means of the field-aspirator and γ-electrometer	980
3. Ionization of the atmosphere	340
4. Radioactivity of springs	21
5. Radioactivity of the atmosphere	95
6. Meteorological measurements	652

The apparatus is described and the results of the measurements are shown in tables, diagrams, and maps.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(1566) THE THERMAL HISTORY OF THE EARTH

By Arthur Holmes

Journal of the Washington Academy of Sciences, Menasha, Wis., vol. 23, no. 4, 1933, pp. 169-196.

This is a reprint of the lecture delivered by the author before a joint meeting of the Washington Academy of Sciences and the Geological Society of Washington on April 7, 1932. The thermal history of the earth is discussed by Holmes under the following headings:

1. Rival hypotheses.
2. Radiothermal energy of the rocks.
3. Distribution of radioactivity in the earth.
4. Physical basis of the rival hypotheses.

Four different sets of conditions:

A 1. The thermal contraction hypothesis.
A 2. Modified form of the thermal contraction hypothesis.
B 1. Hypothesis of thermal cycles.
B 2. Hypothesis of subcrustal convection currents.

Fifteen figures and a list of literature are added.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1567) EINE PRAKTISCHE MÖGLICHKEIT DER TRIANGULATIONSVERBINDUNG MIT DEM AMERIKANISCHEN KONTINENT

(A PRACTICAL POSSIBILITY OF ESTABLISHING A CONNECTION WITH THE AMERICAN CONTINENT BY TRIANGULATION)

By A. Berroth

Zeitschrift für Geophysik, Braunschweig, vol. 9, no. 3, 1933, pp. 145-150.

The practical possibility of establishing a connection between Europe and America or Africa and America by means of triangulation is discussed.

The principle is as follows: Two Piccard balloons are ascended on the continents at each side of the ocean; the balloons are provided with special angle-measuring instruments and with photographic cameras. Two pilot balloons, provided with suitable luminous arrangements, are ascended one after the other in the middle of the ocean. Auxiliary means, accuracy, choice of the location of the balloons, and the method of calculation are discussed.--W. Ayvazoglou.

(1568) GEOPHYSICAL PROSPECTING

Editorial note

Nature, London, vol. 131, no. 3318, 1933, p. 791.

This article is a brief note on the principles of geophysical prospecting in general. Gravimetric, seismic, and electrical methods of prospecting are mentioned.--W. Ayvazoglou.

(1569) WATER FINDING BY GEOPHYSICAL PROSPECTING

Editorial note

Chemical Engineering and Mining Review, Melbourne, vol. 25,
no. 297, 1933, pp. 281-282.

The Imperial Geophysical Experimental Survey of the Commonwealth of Australia made a preliminary investigation of the possibility of indicating the existence of underground water supplies by geophysical methods. Work was undertaken in the Victorian mallee with Mr. Broughton Edge as the director of the survey.

It was found that there is ample justification for a special investigation with the object of developing a method for the indication of the existence of potable underground water.--W. Ayvazoglou.

(1570) GEOPHYSICAL DISCOVERIES

Editorial note

Oil News, London, vol. 33, no. 1,070, 1933, p. 433.

In the article Petroleum Production in Many Lands, the author mentions the discoveries made by geophysical methods of prospecting. His note reads as follows:

> More than 10 new salt domes with depth up to 3,280 feet or more, are reported to have been found during 1932 by seismic and gravitational methods in the western part of the north German plain. Altogether more than 25 geophysically discovered salt-dome prospects are known in this region and of these two have been proved up by drilling.
>
> During the year extensive torsion-balance surveys were made by various companies in the Northern Plains to discover new salt domes and to outline known plugs. In the Danube Basin torsion-balance work has been done to discover anticlinal folds. Magnetic surveys were made in the Thuringia and Danube Basins to locate regional features of the basement rocks. Electrical investigations have been carried out in the salt dome and Thuringian territory to solve local problems.

(1571) MÉTHODES ÉLECTRIQUES ET MAGNÉTIQUE DE GÉOPHYSIQUE APPLIQUÉE

(ELECTRICAL AND MAGNETIC METHODS OF APPLIED GEOPHYSICS)

By Leon de la Forge

Radio-électricité Q.S T français réunis, Paris, vol. 12, no. 86, 1931, pp. 6-9.

A brief description of the principles of the electrical and electromagnetic methods of prospecting is given.--W. Ayvazoglou.

(1572) PRINCIPLES OF STATISTICAL ANALYSIS OCCASIONALLY OVERLOOKED

By A. G. McNish

Journal of the Franklin Institute, Lancaster, vol. 215, no. 6, 1933, pp. 697-703.

Seven frequently overlooked sources of error in the statistical analysis of periodicities are discussed and illustrations of them are drawn from recent published discussions of cosmic-ray observations. It is shown that, through nonobservance of several principles of statistical analysis, many investigators have reached incorrect conclusions as to the reliability of the periodic variations which they have deduced from their observational results. The data taken by Bennett, Stearns, and Compton on Pike's Peak, September 1931, are tested by a criterion different from that which was employed by the original investigators, from which the conclusion is drawn that the variations they observed are attributable to accidents of observation.--Author's abstract.

9. NEW BOOKS

(1573) Daly, Reginald Aldworth. Igneous Rocks and the Depths of the Earth. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, 1933, 598 pp. 190 figs. Price $5. This book brings up to date a statement of principal facts known about eruptive rocks, particularly the facts relating to field relations; summarizes recent geophysical discoveries relevant to the origin of the rocks; and tests a "theory of the earth" by systematic reference to observed results of the planet's eruptivity. Headings of the three parts of the book: Part I, Leading Facts; Part II, A General Theory; and Part III, Application of the General Theory.

(1574) National Research Council. Transactions of the American Geophysical Union, Fourteenth Annual Meeting, April 27, 28, 29, 1933, Washington, D. C. 521 pp. The reports and papers presented at this meeting are given according to the sections into which the Union is divided. The contents of the book are as follows:

O. H. Gish; (13) Progress Report on the International Polar Year of 1932-33, by J. A. Fleming; (14) Progress of World Survey of Cosmic Rays, by A. H. Compton; (15) Progress Report on Mt. Washington Observatory, by Charles F. Brooks; (16) Reports on Magnetic and Electric Work of Organizations in the United States during 1932-33 (five papers by Veryl R. Fuller, R. S. Patton, J. A. Fleming, E. D. Almy, and Joseph G. Brown).

Section of Oceanography (pp. 197-235). (1) Submerged River Valleys of the Bahamas, by Harry Hammond Hess; (2) Investigations of Submarine Valleys, by F. P. Shepard; (3) Monthly Sequence of Sea-Surface Temperature on the New York-San Juan Steamship Route, by E. Monroe Harwood and Charles F. Brooks; (4) Oceanographic Work of the Hydrographic Office and the United States Navy During the Past Year, by W. R. Gherardi; (5) Oceanographic Work of the Coast Guard in 1932 and Plans for 1933, by R. M. Hoyle; (6) Oceanographic Work of the Coast and Geodetic Survey During the Past Year, by R. R. Lukens; (7) Air and Water Temperatures in the West Indian Region, by W. F. McDonald and A. K. S. Showalter; (8) Oceanographic Research at the Scripps Institution of Oceanography, University of California, April 1932 to April 1933, by T. Wayland Vaughan; (9) Oceanographic Research at the University of Washington for the Year 1932, by Thomas G. Thompson; (10) Oceanographic Work at the Hopkins Marine Station, Stanford University, for the Year 1932, by Tage Skogsberg; (11) Report on Oceanography in British Columbia for the Year 1932, by C. McLean Fraser; (12) The Investigations of the International Passamaquoddy Fisheries Commission in 1931 and 1932, by Charles J. Fish; (13) The Development of our Conception of the Gulf Stream System, by C. O'D. Iselin; (14) Submarine Mock Valleys, by W. M. Davis; (15) A Borehole in the Bahamas, by Richard M. Field and Harry Hammond Hess.

Section of Volcanology (pp. 237-250). (1) Volcanic Explosions and Overthrusts, by Walter H. Bucher; (2) Further Remarks on the Cripple Creek Volcano, Colorado, by G. F. Loughlin; (3) Some Features of the Volcanic Sequence in the Cascade Range in Oregon, by Eugene Callaghan; (4) Activity at Santa Maria Volcano in Guatemala, by E. G. Zies; (5) Volcanic History of the Magdalena District, New Mexico, by A. H. Koschmann.

Section of Seismology (pp. 251-336). (1) Address of the Chairman, by Frank Wenner; (2) A Review of Earthquakes of the Past Year, by Joseph Lynch, S. J.; (3) The First Preliminary Waves of the California Earthquake of June 6, 1932, by Perry Byerly and Neil R. Sparks; (4) Adventures of Two Seismograph Tenders During a Severe Earthquake, by A. K. Ludy; (5) The Cedar Mountain, Nevada, Earthquake of December 20, 1932, by Vincent P. Granella and Eugene Callaghan; (6) Experiences over a Submarine Epicenter, by Charles Bittinger; (7) Earthquakes Observed With a Telescope, by Earl L. Williams; (8) Epicenter Determination--A Discussion of Methods, by R. R. Bodle; (9) Strong-Motion Seismograph Equipment and Installations, by H. E. McComb; (10) The Interpretation of Instrumental Records Obtained Within the Destructive Areas of Earthquakes, by Frank Wenner; (11) The Strong-Motion Records of the Southern California Earthquake of March 10, 1933, by Frank Neumann; (12) The Long Beach Earthquake of March 10, 1933, and its Effect on Industrial Structures, by A. C. Chick; (13) Precise

General Assembly (pp. 5-41). (1) Resolutions adopted; (2) report of Committee on Geophysical and Geological Study of Oceanic Basins; (3) symposium on relation of hydrology to other branches of geophysics.

Section of Geodesy (pp. 41-65). (1) Progress Report on the Absolute Determination of Gravity at Washington, by Paul R. Heyl; (2) New Gravity Connection with Potsdam, Germany, by Edwin J. Brown; (3) The Application of Radio to Astronomical Longitude Determinations of the Geodetic Survey of Canada, by Noel J. Ogilvie; (4) Further Results in the Study of Apparent Variations of the Vertical with the Hour-Angle of the Moon, by Harlan T. Stetson; (5) Recent Expansion and Developments in the Time-Service of the United States Naval Observatory, by Paul Sollenberger; (6) The Progress of Geodetic Work in Mexico During Recent Years, by Manuel Medina; (7) Progress of Geodetic Work During the Past Year, by C. L. Garner; (8) Tables for the Isostatic Reduction of Gravity --A Report of Progress, by W. D. Lambert.

Section of Meteorology (pp. 67-108). (1) The Auroral Spectrum and its Interpretation, by Lars Vegard; (2) The Trade Winds of the Eastern Carribean, by Oliver L. Fassig; (3) Some Meteorological Problems in Relation to Radiation, by W. J. Humphreys; (4) Reduction of Meteorological Data from Cruise VII of the Carnegie, by Katharine B. Clarke; (5) Some Interesting Features of Our Warm and Cold Waves, by H. C. Willett; (6) The Value of Cloud Observations, by Charles F. Brooks; (7) The Mount Washington Observatory, by Robert S. Monahan and Salvatore Pagliuca; (8) The Recent Theory of Giao Concerning the Formation of Precipitation in Relation to the Polar-Front Theory, by B. Haurwitz; (9) A Comparison of the Linke and Angström Measures of Atmospheric Turbidity and Their Application to North American Air Masses, by H. Wexler; (10) A Study of the Time-, Areal-, and Type-Distribution of Tornadoes in the United States, by Charles Wilson Browne; (11) Comments on the General Circulation, by R. Hanson Weightman.

Section of Terrestrial Magnetism and Electricity (pp. 110-166). (1) Ozone and the Sunspot Cycle, by Frederick E. Fowle; (2) Some Recent Earth-Resistivity Measurements in the United States, by R. H. Card; (3) Magnetic Anomalies in Alaska, by E. W. Eickelberg; (4) Progress Report on the Work of the Canadian Magnetic Observatories, by W. E. W. Jackson; (5) Magnetic Work of the Dominion Observatory, Canada, by R. Meldrum Stewart; (6) Magnetic Work of the National Astronomical Observatory of Mexico, by Rosendo O. Sandoval; (7) Spectra of the Night Sky, the Zodiacal Light, the Aurora, and the Cosmic Radiations of the Sky, by V. M. Slipher; (8) Some Results of Further Studies in the Correlation of Cosmic Phenomena With Radio Intensities as Measured at the Perkins Observatory, by Harlan T. Stetson; (9) The Interpretation of The Resistivity Prospecting Method for Horizontal Structures, by L. B. Slichter; (10 Transoceanic Radio and Solar Activity, by W. A. R. Brown; (11) The Apparent Effect of Magnetic Activity Upon the Secular Variation of the Earth's Magnetic Field, by A. G. McNish; (12) The Problem of Vertical Earth Currents, by

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Section of Hydrology (pp. 337-521). (1) Annual Reports of Permanent Research Committees for 1932-33; (2) The Use of Stream-Flow Records in Connection With Problems in Hydrology, by C. H. Pierce; (3) Precipitation and Run-off and Altitude Relations for Connecticut River, by H. K. Barrows; (4) An Investigation of the Flow-Duration Characteristics of North Carolina Streams, by Thorndike Saville and John Dargan Watson; (5) The Upper Congo River Drainage Basin, by Wm. F. Uhl; (6) Notes on Variation of Run-off on the Pacific Slope, by Fred F. Henshaw; (7) Storm-Flow Prediction, by H. R. Leach, H. L. Cook and R. E. Horton; (8) The Role of Infiltration in the Hydrologic Cycle, by Robert E. Horton; (9) Revised Temperature Formulas for Predicting Seasonal Precipitation and Run-off in California, by A. F. Gorton; (10) A Study in Evaporation as Affecting the Run-off of Owens River, Calif., by Clem. A. Copeland; (11) Limitations of the Dalton Factor in Evaporation, by Robert E. Kennedy; (12) A Ten-Year Record of Water-Table Fluctuations near Runyon, New Jersey, by Henry C. Barksdale; (13) Fluctuations of Water-Surface in Observation Wells and at Stream Gaging-Stations in the Kokelumne Area, Calif., During the Earthquake of December 20, 1932, by Arthur M. Piper; (14) Specific Yield Determined from a Thiem's Pumping Test, by L. K. Wenzel; (15) Deep-Well Salinity Exploration, by A. G. Fieldner; (16) Notes on the Relation Between the Moisture-Equivalent and the Specific Retention of Water-Bearing Materials, by Arthur M. Piper; (17) Review of the Theory of Turbulent Flow and its Relation to Sediment Transportation, by Monough P. O'Brien; (18) Bed-Sediment Transportation in Open Channels, by C. H. McDougall; (19) Problems in Design of Inland Waterways Treated by Means of Hydraulic Models, by Martin E. Nelson; (20) Equilibrium Conditions in Debris-Laden Streams, by W. W. Rubey; (21) Diversion of Sediment at Branching Channels, by Gerard H. Matthes; (22) Movable Bed Models, by Herbert D. Vogel; (23) Investigation of Wave Action on Sea Walls by the Use of Models, by K. C. Reynolds; (24) Wave Motion in a Channel, by John B. Drisko; (25) Run-off-Investigations from Small Agricultural Areas, by S. H. McCrory.

10. PATENTS

(1575) APPARATUS FOR DETERMINING DEEP-WELL TEMPERATURES

Hallan N. Marsh and John H. Howard, of Huntington Park, Calif.

United States patent 1,913,845 Patent issued June 13, 1933.

The apparatus to which this invention refers serves for determining temperature in boreholes; it comprises a rigid metallic case adapted for lowering to a desired depth in the borehole. The case has a plurality of noncommunicating chambers adapted to hold fragments of solids having graduated and predetermined melting points; means for excluding liquids and outside pressure from the interior of the chambers, and means for lowering the case into the hole and for withdrawing it therefrom.

Claims allowed - 4.

(1576) GEOPHYSICAL EXPLORATION METHOD

Orley H. Truman, of Houston, Tex., assignor to Standard Oil
Development Co., a corporation of Delaware.

United States patent 1,919,917 Patent issued July 25, 1933.

This invention relates to a method of underground exploration by means of impulses passing in the form of direct and reflected waves between sending and receiving stations. The improvement which it presents comprises sending wave impulses from at least two stations differing in distance from each other by substantially one half of the wave length in the upper layer of the earth's surface, whereby the direct waves from the stations are caused to arrive at the receiving station in opposite phase and cancel each other, and recording the waves reflected from subsurface orebodies or the like, such waves arriving in substantially the same phase.

Claims allowed - 2.

(1577) THUNDERSTORM OR ELECTRIC FIELD AND POTENTIAL INDICATOR

Ross Gunn, of Washington.

United States patent 1,919,215 Patent issued July 25, 1933.

This invention relates to an apparatus and system for indicating the electrical conditions of the atmosphere for determining the approach of thunderstorms. It consists of a device for indicating electrostatic potential differences in combination, fixed insulated electrodes, electrodes movable into and out of position adjacent thereto, an amplifier connected to the movable electrodes, an output circuit connected to the amplifier, a rectifier in the output circuit operating in synchronism with the movable electrodes and an indicator connected with the rectifier.

Claims allowed - 15.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director
- - - - -
GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1578) LA BALANZA DE EÖTVÖS

(EÖTVÖS' TORSION BALANCE)

Editorial note

Petróleos y Minas, Buenos Aires, vol. 13, no. 147, 1933, pp. 10-11.

A brief description of the principles of the Eötvös torsion balance is given.--W. Ayvazoglou.

(1579) CALCULATION OF GRADIENTS OF TOPOGRAPHICAL EFFECTS DURING OBSERVATIONS WITH GRAVITY VARIOMETER (IN RUSSIAN)

By S. Evsejev

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 27, 1933, 21 pp.

The author analyses the formulas of gradients U_{xz} and U_{yz} as given by Eötvös and used by Schweydar as starting points; he considers them insufficiently precise, part of rejected members thereof being of the same order as those remaining.

The author is giving his own method of estimating the topographic effects which is based on Gauss' formula of approximate quadratures, and is verifying it on a particular case of relief showing an elliptical surface. Comparing the analytically precise value of U_{xz} in this case with the results of computations according to Schweydar's formula and his own, the author establishes an error of 7.5 percent for the former and about 1 percent for his own. In conclusion tables are given.--Author's abstract.

(1580) SIMPLIFIED FORMULAS OF GRADIENTS OF TOPOGRAPHICAL EFFECTS (IN RUSSIAN)

By S. Evsejev

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 28, 1933, 14 pp.

The author is developing and somewhat modifying his method laid down in his paper, Calculation of Gradients of Topographical Effects during Observations with Gravity Variometer (see preceding article).

1. The number of radii is reduced from 8 to 7.

2. The last radius is equal to 30 m. instead of 50 m., as before.

3. The values of radii, except the first, are given in round numbers, for convenience.

At the end, nomograms are being proposed which considerably facilitate, the author's opinion, the computation of gradients U_{xz} and U_{yz}.--Author's stract.

2. MAGNETIC METHODS

(1581) ÉTUDE MAGNÉTIQUE RÉGIONALE DANS LA RÉGION PETROLIFÈRE DE PECHELBRONN

(REGIONAL MAGNETIC STUDY OF THE PECHELBRONN PETROLIFEROUS BASIN)

By C. L. Alexanian

Le Revue Petrolifère, Paris, no. 536, July 1933, p. 736.

This paper was presented by Alexanian at the International Petroleum ngress in London in July 1933. The translation of the abstract of the per published in "La Revue Petrolifère" reads as follows:

The purpose of this paper is to present the results of a regional magnetic study in the district of Pechelbronn. An outline of the stratigraphy and of the tectonics of the region is given, based on the data obtained by borings.

The author describes his method of carrying out the regional magnetic measurements, the mean distance between the stations being 3 to 4 kilometers. The correlations between the map of isoanomalies and the deep geology are deduced and conclusions on the deposits in Pechelbronn are drawn. The author concludes by expressing the wish that the oil-bearing fields be submitted not only to a regional magnetic exploration but that a local investigation with stations one kilometer distant one from another be carried out also.--W. Ayvazoglou.

(1582) SECULAR CHANGES OF THE MAGNETIC ELEMENTS, OTTAWA, 1500-1930

By W. H. Herbert

Canadian Jour. Research, Ottawa, vol. 9, no. 1, 1933, pp. 94-96.

This paper presents a table of the various elements of terrestrial gnetism at Ottawa from 1500 to 1930 and explains how the values were deved from old magnetic observations made in America and not from theory.

Among other points, it shows that though the total magnetic force has en declining at Ottawa for some time the total magnetic force and the gnetic elements evidently go through cycles and none have apparently ffered permanent change during the time considered.--Author's abstract.

(1583) MAGNETIC DISTURBANCE IN THE SEISMIC AREA OF THE EARTHQUAKE OF NOVEMBER 26, 1930

By Y. Katō and S. Nakamura

Scientific Reports, Tōhoku Imperial University, ser. 1,
vol. 21, 1932, pp. 96-113.

The magnetic observations were made with a dip circle in the epicentral region of the earthquake of November 26, 1930. The disturbance of dip was approximately represented by placing a pair of simple magnets a certain distance from each other on both sides of the main fault found after the earthquake. The depth of the magnets was nearly 3 km. and the distance between them 5.2 km. If the simple magnets are placed by uniformly magnetized spheres of radius 5 km. the intensity of magnetization will be 0.00341 e.m.u. (electro-magnetic unit). If the magnetization is due to the difference in the magnetic susceptibility of rock the anomaly of the susceptibility must be 0.0038 e.m.u. If, on the other hand, the magnetization is due to the difference of stress in the earth's crust, Kirchhoff's constants for magnetostriction must be of the order 0.1 - 100 e.m.u.--Authors' abstract.

(1584) SEISMIC AND VOLCANIC ACTIVITIES AND CHANGES IN THE EARTH'S MAGNETIC FIELD

By Y. Katō

Japanese Journal of Astronomy and Geophysics, Tokyo, vol. 10,
no. 2, 1933, pp. 247-262.

In the first part of the article Katō studies the "Tilting of the earth's crust and the secular variation of the vertical component of the earth's magnetic field", based on observations made at Kakioka, Tsingtau, Mt. Tukuba, and Port Arthur.

The second part deals with "Earthquakes and the earth's magnetic field".

The author reaches the conclusion that the relation between an earthquake and the magnetic variation in a seismic region is very marked and that the magnetic variation is closely related to the preseismic tiltings of the ground.--W. Ayvazoglou.

(1585) BERECHNUNG DES MAGNETISCHEN FELDES EINER STÖRUNG IN ELEKTRISCH DURCHSTRÖMTEM BODEN

(CALCULATION OF THE MAGNETIC FIELD OF A DISTURBANCE IN THE GROUND TRAVERSED BY ELECTRIC CURRENT)

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, no. 4, 1933, pp. 365-369.

The position and the form of a disturbing homogeneous body are calcuated by measuring the disturbed magnetic field of a source of current. It s impossible to obtain only one meaning in the solution of the problem, nless further assumptions resulting from the geological conditions are iven. In the first place it is assumed that the current lines are divergng uniformly from one point and that parts of these current lines can be cut ut so that the other current lines are not affected. By using ellipitcal unctions the magnetic field changed by the lack of these parts can be repreented at any point on the surface. The desired reversion--that is, the inding of the function and of the form from the field at different points n the surface--is discussed.--Author's abstract translated by W. Ayvazoglou.

(1586) SUCCESSFUL MAGNETOMETER SURVEY OF CONROE AREA

By L. H. Williams

Oil Weekly, Houston, vol. 70, no. 10, 1933, pp. 47-48.

Williams presents a map of magnetic survey of Conroe area made with an skania vertical magnetometer by K. L. McHenry in 1932. Five days were reuired for covering the area, and the survey was made when but few wells ere in existence in the field.

The disturbance recorded in this map is, in the opinion of the author, f particular interest.

The position and outline of the field have been superimposed upon the agnetic contours, and the close resemblance of the outline of the field ith magnetic closure is outstanding. The author concludes that, although he magnetic results obtained in the Conroe district cannot be considered erfect, considering the fact that the survey was not of a detailed nature he result is encouraging to say the least.--W. Ayvazoglou.

(1587) MAGNETIC INVESTIGATIONS AND PETROLEUM POSSIBILITIES IN CENTRAL GERMANY

By R. v. Zwerger

Erdöl und Teer, vol. 9, 1933, pp. 205-206.

An abstract of the article, signed E.B.E., is published in the Journal of the Institution of Petroleum Technologists, London, vol. 19, no. 116, 1933, p. 206-A. The abstract reads as follows:

> A brief sketch of the development of geomagnetic methods is given, and it is suggested that the region between the Harz and the "Thuringian Forest is suitable for testing out the methods, on account of the well known geology of the area, some account of which is given. A geomagnetic survey in 1931-2 traced the crystalline ridges and their offshots in this region.
>
> The oil-bearing strata must be looked for in the low regions between these ridges in the Thüringian Basin. The earth-movements of the Cretaceous and Tertiary periods have caused the oil to collect and prevented its migration. The oil reservoirs must be sought in the coastal regions, on the edges of the old high regions and sometimes on the chalk reefs. A boring on the Forstberg has yielded much gas, and it is expected that a second boring, going geologically deeper, will find oil also. A third experimental boring is being made in the West Ettersberg.

3. SEISMIC METHODS

(1588) ON THE EFFECTS OF DISCONTINUITY SURFACES UPON THE PROPAGATION OF ELASTIC WAVE

By G. Nishimura and K. Kanai

Bulletin of the Earthquake Research Institute, Tokyo, vol. 11, no. 2, 1933, pp. 123-186.

In the present paper the authors study the effects of a boundary surface where the two elastic solids that come into contact slide upon each other without any friction on the propagating waves. The elasticity conditions at the boundary surface treated in this paper are, according to the authors, not only perfectly correct from the theory of elasticity but also furnish interesting properties of wave propagation which cannot be obtained from the boundary condition in which the two solids adhere closely at the common boundary.

The paper consists of two parts: (1) Effect of a boundary surface of contact of two semi-infinite solids upon the propagation of waves, and (2) initial movement of the free surface of a stratified solid.--W. Ayvazoglou.

(1589) AMPLITUDE OF RAYLEIGH WAVES ON THE SURFACE OF A STRATIFIED MEDIUM

By Takeo Suzuki

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 11, no. 2, 1933, pp. 187-195.

Suzuki gives a mathematical discussion of the problem of the propagation of the Rayleigh waves on a stratified surface, based on investigations by K. Sezawa (Bull. Earthquake Research Inst., vol. 3, 1927, pp. 1-18) on the general relation between the thickness of the layer and the wave velocity, without the assumption that the media are incompressible.--W. Ayvazoglou.

(1590) THE CONSTRUCTION AND STUDY OF AN ACCELERATION SEISMOGRAPH

By Takuro Tamaru

Bulletin of the Earthquake Research Institute, Tokyo, vol. 11,
no. 2, 1933, pp. 362-381.

1. The object of the seismograph described.- To construct a seismograph capable of recording acceleration directly, and to do away with the defects inherent to the present time seismographs, such as unstable in arrangement, incapable of recording the three dimensional movements by a single mass, deflection of the index outside of the limit of the recording paper as the result of a too great amplitude, etc.

2. The general construction.- It consists of the main frame, the pendulum, and three sets of drums and indexes. The cast-iron frame has the width and length equal to 42 cm., and the height is 41 cm. The single mass of pendulum is 40 kg. In the right and in the front there are two indexes which register the horizontal movements and in the left one index which records the vertical movement. Each index touches on its respective drum, which rotates with a speed of 9 cm. per minute and draws the diagram during the whole day on a sheet of paper. The cost of the seismograph is about 500 yens, including the accessories.

3. General characteristics.- (1) Recording of acceleration; (2) registering the three dimensional movements; (3) stable equilibrium; (4) less influence of proper oscillation and changes of temperature; (5) special arrangement to restrict the index motion within certain limits; (6) lessening of the effect of the friction at the end of the index when small acceleration is registered; (7) suffers less influence of the earth's tilting.--W. Ayvazoglou.

(1591) EARTHQUAKE NOTES

Edited by R. R. Bodle

Eastern Section, Seismological Society of America, Washington, D.C., vol. 5, no. 1/2, 1933, pp. 251-336.

This number includes the entire proceedings of the joint meeting of the Section of Seismology of the American Geophysical Union and of the Eastern Section of the Seismological Society of America, which was held in Washington, D.C., April 27-29, 1933.

For the list of the reports and papers presented at this meeting see Geophys. Abstracts 53, pp. 917-921.--W. Ayvazoglou.

(1592) A SECOND STUDY OF BLASTING RECORDED IN SOUTHERN CALIFORNIA

By Harry O. Wood and Charles F. Richter

(with a note by Hugo Benioff)

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 23, no. 3, 1933, pp. 95-110.

Investigation of several blasts subsequent to those considered in a previous study, and in particular a major blast set off near Victorville, Calif., on September 12, 1931, has yielded results as follows:

1. In two cases the time of detonation was determined (a) very accurately in the case of the blast near Victorville by a precise method, and (b) probably with substantially equal accuracy in the case of the blast in the Arroyo Seco, though the method employed was inherently less precise.

2. Phases, or definite changes in registered motion, have been recognized and measured which appear to correspond to successive arrivals of waves traveling, apparently, along direct paths with different apparent velocities as follows: 6.0- to 5.9+, 5.55, 5.4-, 5.0+, 4.1, 3.5-, 3.4-, 3.25, 3.15, 3.0-, 2.7± kilometers per second.

3. In the present study no positive evidence has been found to indicate reflected waves, or waves refracted along deeper layers. Phases considered in the previous study to indicate such waves are now found to be susceptible of alternative explanations.

Difficulties have been encountered, as discussed in the body of the paper, in the interpretation and satisfactory explanation of certain very numerous apparent phases, particularly those which appear to indicate waves with apparent velocities of 6.0- to 5.9+, and 4.1 kilometers per second.

From this it is again clear that further opportunities for similar inestigations have great importance. For this reason, and also in order that lasts of moderate, or larger, magnitude may not be included in lists of nall local earthquakes, it is suggested that all such blasts set off in the egion of Southern California should be reported to the Seismological aboratory at Pasadena--and, whenever practicable, far enough in advance to ermit preparation for thorough study.--Authors' abstract.

(1593) THE RECORDING OF STRONG SEISMIC MOTION

By A. Blake

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 23, no. 3, 1933, pp. 111-127.

In designing a seismograph to measure strong motion it is important not o confine attention merely to the maximum acceleration or displacement of he earth motion; these are not sufficient to determine how much a building ill be damaged. The fundamental problem is to measure the amount of motion ssociated with the periods to which the buildings respond. These periods re in the range from three tenths of a second to three seconds. For this urpose a seismograph with a natural period of one second would be better han an instrument of either the accelerometer or displacement-meter type.--uthor's abstract.

4. ELECTRICAL METHODS

(1594) FORTSCHRITTE IM ELEKTRISCHEN AUFSUCHEN VON PETROLEUM

(PROGRESS IN THE ELECTRICAL PROSPECTING FOR OIL)

By A. Belluigi

World Petroleum Congress, London, 1933, 5 pp.

This is a reprint from a paper presented by Belluigi at the World Petroleum Congress organized by the Institution of Petroleum Technologists and held in London from July 19 to 25, 1933.

The author's abstract reads as follows:

The requirements necessary for methods used in prospecting for oil are stated and discussed. Direct and indirect methods are considered, their difficulties explained, and their possibilities examined.

In the case of electromagnetic measurements the results obtained from interpretation by means of analytical methods are compared with those resulting from the new graphical method.

(1595) A GEOPHYSICAL EARTH TESTER

Editorial note

Journal of Scientific Instruments, London, vol. 10, no. 6, 1933, pp. 185-186.

An instrument is described having a lower range than 0-3 ohms, so that to increase the use of the instrument and to extend the scale of investigations. This has involved a modification of the principle and of the design of the megger earth tester, and a feature has been incorporated which renders unnecessary any correction for potential electrode resistance. The new instrument has two ranges, 0-0.3 and 0-3.0 ohms.

Details of the instrument and a circuit diagram of geophysical earth tester are given.--W. Ayvazoglou.

(1596) GRÜNDWASSER UND MINERALQUELLEN-TAGUNG DER DEUTSCHEN GEOLOGISCHEN GESELLSCHAFT

(UNDERGROUND-WATER AND MINERAL-SPRINGS SESSION OF THE GERMAN GEOLOGICAL SOCIETY)

By E. A. Scheibe

Glückauf, Essen, vol. 69, no. 28, 1933, pp. 637-640.

The session was held on May 25 and 26, 1933, in Frankfurt-am-Main. Geophysical methods of prospecting for water were discussed by Prof. Dr. Reich, who described the principles of electrical methods, and by Dr. Ebert, who examined the apparatus and the process of electrical prospecting for water.--W. Ayvazoglou.

(1597) THE ELECTRICAL STUDY OF DAM FOUNDATIONS

By M. Lugeon and C. Schlumberger

Mining Magazine, London, vol. 48, no. 6, 1933, pp. 340-345.

The authors describe the application of electrical prospecting methods to the study of dam foundations and associated structures. Investigations were carried out at the Sarrans Dam site on the river of La Truyère, a tributary of the Lot, in the department of Aveyron (see also Geophys. Abs. 43, pp. 647-648).

According to the authors the experiments at La Truyère show that there exists a definite relationship between the specific electrical resistivity of the granite and its degree of weathering, as well as its permeability to water.

After carrying out about 500 measurements the authors could ascertain that the granite on which Sarrans dam is built shows electrical resistivities larger than 5,000 ohms-m^2/m in the zones where it is compact and below this figure in the zones where it is weathered and pervious.

Measurements in the drill holes, on the other hand, showed a definite relation between the resistivities and the coefficients of absorption of the water. It therefore seems evident that the study of the electrical resistivity of the rocks is interesting in connection with all engineering projects where the question of the watertight properties of the rocks is of paramount importance.

The authors conclude that consequently electrical prospecting can render appreciable services in the studies of dam foundations, tunnel sites, spillways, and other work of this character involved in hydroelectric projects.--W. Ayvazoglou.

(1598) ÜBER DEN STAND DER GEOELEKTRISCHEN METHODEN DER ANGEWANDTEN GEOPHYSIK FÜR DIE AUFSUCHUNG VON ERDÖLLAGERSTÄTTEN

(ON THE CONDITIONS OF THE GEOELECTRICAL METHODS OF PROSPECTING IN APPLIED GEOPHYSICS FOR DISCLOSING OIL DEPOSITS)

By Otto Keunecke

Petroleum Zeitschrift, Berlin, vol. 29, no. 30, 1933, pp. 5-6.

After a brief discussion on the deficiency of the existing methods of electrical prospecting for oil, Keunecke describes a new method, applied by Piepmeyer & Co., by which, according to the author, more valuable data can be obtained.

In this new method, called the induction method, the alternating current of the usual frequency (500) is not conducted directly into the ground by means of electrodes but is sent into a cable which is put on the ground in the form of a loop.

According to the author, the importance of the new method consists in the fact that salt-water horizons, which are good conductors, can be located with a great degree of certainty.--W. Ayvazoglou.

(1599) POSSIBILITA SPERIMENTALI RELATIVE AI METODI GEOELETTRICI WENNER E RACOM

(EXPERIMENTAL TESTS REGARDING WENNER AND RACOM GEOELECTRIC METHODS)

By Arnaldo Belluigi

Bolletino della Societa Geologica Italiana, Rome, vol. 52, no. 1, 1933, pp. 173-180.

Experimental tests relating to the Wenner and Racom geoelectric methods are examined, especially with regard to the merits of the megger and the simple and double compensation potentiometers.

Principles of electrical methods of prospecting are briefly discussed.—W. Ayvazoglou.

(1600) PROGRESSI NELLE RICERCHE ELETTRICHE DEL PETROLIO

(PROGRESS IN THE ELECTRICAL PROSPECTING FOR OIL)

By Arnaldo Belluigi

Extract from L'Industria Mineraria, Rome, vol. 7, no. 6, June 1933, 11 pp.

The author discusses the improvements of the electrical methods of prospecting, especially with regard to the adjusting of the anomalies observed by the instrument to the real anomalies and to the determination of the depths. —W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1601) DIRECT FUSION METHOD FOR DETERMINING THE RADIUM CONTENT OF ROCKS

By Robley D. Evans

Physical Review, Lancaster, Pa., vol. 43, no. 3, 1933, pp. 211-212.

This paper was presented by the author at the 181st meeting of the American Physical Society at the California Institute of Technology on December 16 and 17, 1932. The abstract of the paper, as published in the Phys. Rev., vol. 43, no. 3, 1933, pp. 211-212, reads as follows:

> New principles for removing radon from rocks and for measuring minute quantities of radon are presented. Powdered-rock specimens are boiled without flux by direct heating in a vacuum, graphite, resistance furnace. The duration of heating is 2½ minutes, which is to be compared with 1 hour for the quickest of former methods. The gases from the melt are led through an electrostatic ion-trap to the ionization chamber. A small insulation

drying device in the ionization chamber protects the amber from water vapor. The natural observational limit for measurements of small quantities of radon is defined as the point at which the average ionization from the radon just equals the probable statistical variation in the background ionization due to cosmic and local radiation, and an apparatus is described which permits measuring radon down to this limit. A string electrometer measures only the difference in ionization in two identical ionization chambers, both of which contain the same background gases, but only one of which contains the radon to be measured. A systematic study of the percentage of the total radon removed from biotite granite as a function of (a) temperature, (b) duration of heating, (c) fineness of sample grains, showed that temperature is the only important factor, and that 1,800° C. effects complete radon removal.

(1602) ZUR DEUTUNG DER EXPERIMENTELLEN BESTIMMUNG DER MITTLEREN SPEZIFISCHEN IONISATION DER HÖHENSTRAHLUNG AUS VERGLEICHENDEN MESSUNGEN MIT IONISATIONSKAMMER UND EINEM ZÄHLROHR

(CONCERNING THE INTERPRETATION OF THE MEAN SPECIFIC IONIZATION OF PENETRATING RADIATION AS DETERMINED EXPERIMENTALLY FROM THE COMPARATIVE MEASUREMENTS WITH THE IONIZATION CHAMBER AND A TUBE COUNTER)

By W. Kolhörster and L. Tuwim

Zeitschrift für Physik, Berlin, vol. 81, no. 7/8, 1933, pp. 435-444.

Based on the new results established in the quantum-mechanics the abnormally high value of the specific ionization of penetrating radiation K = 135 ions/cm^{-1}, as determined experimentally by Kolhörster and Tuwim, is absolutely natural. The meaning of "specific ionization" is defined, and it is shown that the method applied answers exactly this definition provided that (1) the relation between the impact-number and the square of the sine of the angle of inclination of the tube counter to the vertical is rectilinear, and (2) N_0 is independent from the size of the tube counter. According to the experiments carried out so far, both these conditions proved to be correct.

The low values obtained for specific ionization by other authors can therefore not be considered an argument against the high values, as Locher tried to do it. Further suggestions for the determination of K are discussed.--Authors' abstract translated by W. Ayvazoglou.

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(1603) EINE NEUE METHODE ZUR BESTIMMUNG DES EMANATIONS-GEHALTES DER ATMOSPHÄRE UND IHRE ANWENDUNG ZUR UNTERSUCHUNG DER ZUSAMMENHÄNGE MIT DEN METEOROLOGISCHEN FAKTOREN, UND DES EINFLUSSES DES EMANATIONSGEHALTES DER ATMOSPHÄRE AUF DIE MESSUNGEN DER ULTRASTRAHLUNG

(A NEW METHOD FOR DETERMINING THE EMANATION-CONTENT OF THE ATMOSPHERE AND ITS APPLICATION FOR THE INVESTIGATION OF THE EFFECTS OF THE METEOROLOGICAL FACTORS, AND OF THE INFLUENCE OF THE EMANATION-CONTENT OF THE ATMOSPHERE UPON THE MEASUREMENTS OF THE PENETRATING RADIATION)

By W. Messerschmidt

Zeitschrift für Physik, Berlin, vol. 81, no. 1/2, 1933, pp. 84-100.

The author describes a method for determining the emanation-content of the atmosphere. The method is based on a direct measurement of conductivity of a sample of air compressed inside of an ionization-chamber.

A schematical design of the apparatus is given, and the results of the measurements are shown in a series of diagrams and tables.

A detailed critical review of the article is published by A. G. McNish and C. R. Wait in Terrestrial Magnetism and Atmospheric Electricity, vol. 38, no. 2, 1933, pp. 105-106.--W. Ayvazoglou.

(1604) GESTEINBRÜCHE DURCH RADIO NACHWEISBAR

(ROCK FRACTURES CAN BE DISCOVERED BY RADIO)

By Karl Tripp

Umschau, Frankfurt-am-Main, vol. 37, no. 23, 1933, pp. 434-436.

The author describes a phenomenon which he considers may serve as a new means of prospecting for minerals.

According to his statement, it was established that in passing with a radio apparatus with a fixed frame antenna over rock fractures, the sound of the whistle adjusted by means of a reverse connection (Rückkopplung) changed. The index of an ammeter which was switched on instead of the head phones showed a deflection. The reason of this effect was not established. Curves representing this phenomenon are given.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(1605) TEMPERATURMESSUNGEN IN BOHRLÖCHERN DER UMGEBUNG VON HAMBURG

(TEMPERATURE MEASUREMENTS IN BOREHOLES IN THE VICINITY OF HAMBURG)

By E. Koch

Mitteilungen aus dem Mineralogisch-Geologischen Staatsinstitut,
Hamburg, Heft XIV, 1933, pp. 53-80.

The results of 31 temperature measurements carried out by the author since 1920 are discussed. Maximum thermometers manufactured by Carl Kramer of Freiburg i. Br. were used.

The results of measurements are divided into three groups, according to the geothermal gradients:

1. From 29 to 39 meters per 1° C.
2. Less than 29 meters per 1° C.
3. More than 39 meters per 1° C.

--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1606) GEOPHYSICS

By Oscar Weiss

Journal of the Institution of Petroleum Technologists, London,
vol. 19, no. 116, 1933, pp. 437-447.

In this paper Weiss analyses the developments of the last 3 years in methods and instruments and examines future possibilities in geophysical prospecting for oil.

The development of higher accuracy and the combination of methods is, according to the author, the characteristic advancement of recent years compared with previous practice. Weiss gives a brief survey of the main developments in the following methods:

Torsion-balance method.- Improved methods of interpretation; mechanical integrator for determining the gradient and curvature values of bodies with any given cross-section; investigation concerning the disturbances of the torsion balance; reduction of the size of the balance; torsion balance with three beams; etc.

Seismic method.- The range of the refraction method was extended to a depth of 7,500 feet; higher accuracy of the instrument; transmission of signals by wireless; use of the refraction method for determining the mushrooming of salt domes utilizing existing wells; application of the seismic method to loosely consolidated sediments where the velocity of the elastic waves is a continuous function of the original overburden; introduction of the use of seismic reflection in oil prospecting, and others.

Earth-magnetic methods.- The recent developments in these methods have not opened up any new possibilities in oil prospecting; however, clearer understanding of the influence of different factors involved in the measurements was attained; the development of instruments was marked by the construction of a new compensated magnetometer of the Schmidt type, and a new magnetometer was built on the principle of the dip needle for use on strong magnetic anomalies in reconnaissance work.

Electrical methods.- So far these methods have little use in prospecting unknown areas for oil; furthermore, the value of the information obtained is limited by comparatively shallow depths up to which reliable data can be obtained; notwithstanding this the author admits that developments are progressing rapidly.

Radioactive methods.- Investigations with these methods have been unsuccessful, although faults and fissures at shallow depth may sometimes be indicated by increased emanation, but experiments on known salt domes in Germany and in the U.S.A. have given no reliable results.

The author concludes: The ultimate aim of geophysical prospecting methods should be the direct locating of oil. It would seem that gravity, earth-magnetic, seismic-refraction and electrical methods based on resistivity differences have little chance of achieving this purpose. The scope of these methods may be further handicapped in the future by the increasing depth of the oil horizons exploited. It is not impossible that new methods will be developed to fulfill the new requirements.--W. Ayvazoglou.

(1607) GEOPHYSICS IN THE OIL FIELD

Editorial note

Mining Magazine, London, vol. 49, no. 1, 1933, pp. 4-5.

This is a review of Oscar Weiss' article published in the Journal of the Institution of Petroleum Technologists, vol. 19, no. 116, June 1933, pp. 437-447, under the title "Geophysics."

In his article Weiss discusses the recent progress in geophysical exploration as applied to oil-field work (see preceding article).--W. Ayvazoglou.

(1608) FIELD INSTRUMENTS

By D. C. Gall

Journal of Scientific Instruments, London, vol. 10, no. 7,
1933, pp. 197-203.

General rules in designing instruments to meet the conditions under which they are to be used in the field are discussed.--W. Ayvazoglou.

(1609) SOME EXPERIMENTS ON EARTH CURRENT (II)

By H. Noto

Japanese Journal of Astronomy and Geophysics, Tokyo, vol. 10, no. 2,
1933, pp. 202-203.

The first paper on the experiments with earth currents was published by Noto in the same journal, vol. 7, no. 3, 1930, pp. 105-122 (see Geophys. Abs. 17, pp. 13-15).

In this second paper Noto describes the apparatus and the results obtained from measurements of earth-currents in 1930-31 at Irako, Peninsula of Atumi, in the middle of the southern coast of Japan.

A detailed review of the second paper is given by W. J. Rooney in Terrestrial Magnetism and Atmospheric Electricity, vol. 38, no. 2, 1933, pp. 143-144.--W. Ayvazoglou.

(1610) CONTRIBUTI DELLA GEOFISICA AGLI STUDI GEOPETROLIFERI DELL' AZIENDA GENERALE ITALIANA PETROLI (A.G.I.P.)

(CONTRIBUTION OF GEOPHYSICS TO THE STUDY OF OIL-BEARING REGIONS ACCOMPLISHED BY THE GENERAL ITALIAN PETROLEUM CONCERN)

Presented by A. Belluigi

Azienda Generale Italiana Petroli, Rome, 1933, 14 pp.

A report is given on the geophysical work of the A.G.I.P. for oil research in Italy. This work concerns the prospection of vast plains in the valley of the Po and in the hills, for nearly 12,000 km^2.

Gravimetrical, magnetic, and electrical methods were used. Seismic methods were not used extensively because the particular structure did not allow the employment of these methods; they will be used for the researches in Central and South Italy. Some results of the work are discussed.--W. Ayvazoglou.

(1611) APPUNTI SULLA RICERCA MODERNA DEL PETROLIO

(A NOTE CONCERNING THE MODERN PROSPECTING FOR OIL)

By Arnaldo Belluigi

Extract from L'Industria Mineraria, vol. 7, no. 2, 1933, 16 pp.

Belluigi gives a review of a series of articles concerning prospecting for oil.--W. Ayvazoglou.

(1612) MORE THAN 100 CREWS ON COAST GEOPHYSICAL WORK

Editorial note

The Oil Weekly, Houston, vol. 70, no. 10, 1933, pp. 75-76.

According to this note, separate geophysical instrument crews are very active in the search for new oil and gas prospects in the Louisiana Gulf Coast and Texas.

The author of the note gives a summary of geophysical operations in these regions as follows:

Instrument type	Texas Gulf Coast	Texas interior	Louisiana Gulf Coast	Total
Reflection	29	7	8	44
Torsion balance	18	1	12	31
Magnetometer	1	2	3	6
Gravity meter	3	-	-	3
Pendulum	1	-	-	1
Total	52	10	23	85

--W. Ayvazoglou.

9. NEW BOOKS

(1613) Askania-Werke, A. G., of 87-88 Kaiserallee, Berlin Friedenau, Germany, has prepared a leaflet which describes a form of electrometer for use in the geophysical exploration of country covered with water. A brief description of the instrument is given in the Mining Magazine, London, vol. 48, no. 6, June 1933, pp. 360-361.

(1614) Chadwick, J. Radioactivity and radioactive substances. Third edition. With a foreword by Lord Rutherford. 116 pp. London, Sir Isaac Pitman and Sons, Ltd. Price 2s. 6d. net. In this new edition the text has been corrected in some places, and in others amplified so as to bring it into agreement with the later developments. The numerical data and tables have been revised. In the foreword, Lord Rutherford strongly recommends the book as "a simple, concise and accurate statement of the main factors and theories".

1615) Hoyer-Kreuter. Technologisches Wörterbuch (Technological Dictionary), 6th edition, by Dr. Alfred Schloman; Vol. 1, German-English-French, 795 pp.; vol. 2, English-German-French, 767 pp. Berlin, 1932. Julius Springer. Price of each volume, M. 78.

1616) Reich, Hermann. Angewandte Geophysik für Bergleute und Geologen (Applied Geophysics for Mining Engineers and Geologists). Paper covers, 151 pp., illustrated. Price, R.M. 12.60. Leipzig, Akademische Verlagsgeselschaft, G.m.b.H.

1617) Scrase, F. J. The air-earth current at Kew Observatory. Geophysical Memoirs No. 58, 22 pp. with 7 plates. London, H. M. Stationery Office. Price, 2s. 6 d. net.
An apparatus for obtaining continuous records of air-earth current and potential gradient is described in detail. The chief feature is the method of compensating for changes in the earth's field and so obtaining a record from which the air-earth current is derived by direct measurement. The results obtained from 1 year's records are discussed and the main conclusions given.

1618) Steers, J. A. The unstable earth. E. P. Dutton, New York, 1932, 341 pp., 66 figs. Price, $4.30. Geotectonic processes are discussed with special consideration of theories developed by Chamberlain, Kober, Jeffreys, Wegener, Gregory, Joly, Daly, and Holmes.

1619) Wirths, F. Die Erdgeschichte als Phasenbild der allgemeinen kosmischen Abkühlung (History of the World as a Phase-Picture of the General Cosmic Cooling Process). Theoretical considerations on the causes of the cyclic geological development and on the genetic relationship between the formation of mountains, volcanism, movements of the oceans, and variations of climate. 83 pp., 5 figs. Halle (Saale), 1933, Wilhelm Knapp. Price, M. 6.

10. PATENTS

(1620) MAGNETISCHE WAAGE

(MAGNETIC BALANCE)

Hauser & Co., G.m.b.H. of Augsburg

German Patent 573,573 Patent issued April 3, 1933.

The invention relates to a magnetic balance characterized by such a shape of the metallic casing inside of which eddy currents are produced, that the body of the casing surrounds the magnetic lamellae at a distance suitable for damping the oscillating system.

Claims allowed - 1.

(1621) VORRICHTUNG ZUR BESTIMMUNG DER GELÄNDEKORREKTION BEI MESSUNGEN DES HORIZONTALEN SCHWEREGRADIENTEN UND DER KRÜMMUNGS GRÖSSEN DER POTENTIALFLÄCHEN

(ARRANGEMENT FOR DETERMINING THE TOPOGRAPHIC CORRECTION DURING THE MEASUREMENTS OF THE HORIZONTAL GRAVITY GRADIENT AND OF THE CURVATURE VALUES OF THE POTENTIAL SURFACES)

Dr. Wilhelm Haubold of Göttingen

German Patent 575,627 Patent issued May 3, 1933.

This invention relates to an arrangement for determining the topographic correction during the measurements of the horizontal gravity gradients and of the curvature values of the potential surface with the air of the Eötvös torsion balance. The arrangement consists of the application of a horitontal lath provided with special graduation.

Claims allowed - 5.

(1622) VORRICHTUNG ZUR KOMPENSATION DES TEMPERATURENFLUSSES BEI MAGNETISCHEN WAAGEN

(ARRANGEMENT FOR COMPENSATING THE INFLUENCE OF THE TEMPERATURE UPON MAGNETIC BALANCES)

Askania-Werke A.-G. vormals Centralwerkstatt Dessau und Carl
Bamberg-Friedenau of Berlin-Friedenau

German Patent 575,870 Patent issued May 4, 1933.

This invention relates to an arrangement for compensating the influence of temperature upon magnetic balances in which the materials of the knife-edge bearer and of the magnetic lamellae have different heat coefficients of expansion. The arrangement consists of one-sided loading of the magnetic system by attaching a weight to the magnetic lamellae. This one-sided loading of the magnetic system is compensated by a suitable development of the knife-edge bearer or by affixing to it a weight.

Claims allowed - 4.

(1623) MAGNETSYSTEM FÜR MAGNETISCHE WAAGEN

(MAGNETIC SYSTEM OF MAGNETIC BALANCES)

Askania-Werke A.-G. vormals Centralwerkstatt Dessau und
Carl Bamberg-Friedenau of Berlin-Friedenau

German Patent 576,814 Patent issued May 1933.

The magnetic system of magnetic balances to which this invention is relating is characterized by such an arrangement of the knife-edge in which the latter is situated between the magnet lamellae.

Claims allowed - 1.

(1624) VERFAHREN UND VORRICHTUNG ZUR AUFSUCHUNG VON ERZAUSBISSEN ODER ERZANREICHERUNGEN IN FLACHEN GEWÄSSERN ODER DURCHFEUCHTETEN SANDEN ODER GERÖLLEN

(METHOD AND APPARATUS FOR DISCOVERING ORE OUTCROPS AND ORE ENRICHMENTS COVERED BY SHALLOW WATERS, WET SANDS, OR BOULDERS)

Hauser & Co., G.m.b.H. of Augsburg, and Johann B. Ostermeier
of Mering near Augsburg

German Patent 577,272 Patent issued June 1, 1933.

This invention relates to a method for discovering ore outcrops and ore enrichments covered by shallow waters, wet sands, etc. The potential difference between the two metal electrodes of equal electro-chemical value can be established by this method. The polarization voltage can be measured as soon as 1 of the 2 electrodes touches the surface of the ore to be discovered.

Claims allowed - 5.

(1625) VORRICHTUNG ZUR KOMPENSATION DES TEMPERATUREINFLUSSES BEI MAGNETISCHEN WAAGEN

(ARRANGEMENT FOR COMPENSATING THE INFLUENCE OF THE TEMPERATURE UPON MAGNETIC BALANCES)

Askania-Werke A.-G. vormals Centralwerkstatt Dessau und
Carl Bamberg-Friedenau of Berlin-Friedenau

German Patent 577,478 Patent issued May 31, 1933.

This invention relates to an arrangement for compensating the influence of temperature upon magnetic balances by means of a balance-body affixed to one part of the magnetic system and made from material having a different heat coefficient of extension than the material of the part carrying the balance-body. The balance-body is provided with a horizontally movable weight.

Claims allowed - 2.

(1626) PROCEDE ET APPAREIL POUR LA MESURE DE LA DÉVIATION DES SONDAGES

(METHOD AND APPARATUS FOR MEASURING THE DEVIATION OF BOREHOLES)

Societe de Prospection Électrique (Procédés Schlumberger)
residing in France (Seine)

French Patent 742,430 Patent issued March 7, 1933.

This invention relates to the determination of the deviation of a borehole from the vertical by measuring the angle of the inclination and the azimuth between the horizontal projection of the axis of the bore hole and the north direction.

By the method described, the angle of inclination and the azimuth of inclination can be obtained simultaneously.

The method is based on the use of an induction needle put in rotation by means of an electric motor and on the measuring of the induced electromotive forces which arise in this needle under the action of the terrestrial magnetic field or under the action of a small magnetized pendulum.

Claims allowed - 1.

(1627) BALANCE MAGNETOMETRIQUE

(MAGNETIC BALANCE)

Hauser & Co., B.m.b.H., residing in Germany

French Patent 743,724 Patent issued April 5, 1933.

This invention relates to the magnetic balances with two telescopes, the optical axes of which in the plane of oscillation are inclined at equal angles with regard to the reflecting surface. By looking through one of these telescopes the image produced by the other telescope can be observed. One of the telescopes is provided with a graduation scale and the other with a mark. The graduation scale and the mark coincide when the image is observed.

Claims allowed - 6.

(1628) SYSTEME MAGNETIQUE POUR BALANCES MAGNETIQUES

(MAGNETIC SYSTEM FOR MAGNETIC BALANCES)

Hauser & Co., G.m.b.H., residing in Germany

French Patent 743,725 Patent issued April 5, 1933.

The present invention relates to the mounting of the oscillating magnetic system which is not affixed at the two sides of the bar magnets but is adjusted between the magnets.

Claims allowed - 17.

(1629) PROCEDE ET DISPOSITIF POUR LA RECHERCHE DES MINERALS

(METHOD AND APPARATUS FOR EXPLOITING MINERALS)

Hauser & Co., B.m.b.H., residing in Germany

French Patent 743,726 Patent issued April 5, 1933.

This invention relates to a method for exploring minerals. It consists of touching the ground with one electrode and of determining, as soon as the search-electrode comes in contact with a metallic body or a mineral, the difference of the potential produced in a closed circuit by means of an electrolyte, for example by water, with regard to a second electrode, the electrical properties of which are similar to those of the first electrode.

Claims allowed - 4.

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.A. No. 55 UNITED STATES BUREAU OF MINES November, 1933.
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

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Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1630) THE ECONOMIC APPLICATION OF THE TORSION BALANCE IN OIL PROSPECTING

By Jas. C. Templeton

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 31.

The abstract of Templeton's paper, as published in this issue of the Petroleum Times, may be rendered briefly as follows:

Templeton discusses the extensive application of the torsion balance as an aid in prospecting for oil and gas. According to the author, the popular conception that the torsion-balance method is limited to flat territories, remote from all hills or mountainous features, no longer holds good.

The author concludes by stressing the paramount importance of the geologist-geophysicist in the practical application of the torsion balance.--W. Ayvazoglou.

(1631) THE OBSERVATION OF GRAVITY BY MEANS OF INVARIABLE PENDULUMS

By E. C. Bullard

Proceedings of the Royal Society, London, Series A, vol. 141,
July 1933, no. A 843, pp. 233-258.

In this paper the author describes the methods of observation of gravity by means of invariable pendulums developed in Cambridge. According to the author, they differ from former methods in that (1) no special signals are required; (2) the apparatus is considerably more portable than any so far described; and (3) the errors in timing are so small that, with a 1-hour swing, they are negligible compared with other sources of uncertainty.

Author's abstract of the paper reads as follows:

> A method of comparing the periods of pendulum swinging simultaneously at two stations is described. This does not require special wireless signals and enables a relative determination of g to be made with an accuracy of 1/1,000,000 in two swings of 1 hour each. A method of comparing gravity pendulums and wireless time signals is also described.--W. Ayvazoglou.

(1632) FAULT OR ANTICLINE: A DISCUSSION OF A TORSION-BALANCE SURVEY IN SOUTH AMERICA

By Raoul Vajk

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 32.

An abstract of the paper is given in this issue of the Petroleum Times. It reads as follows:

The author discusses the interpretation of a torsion-balance survey in South America. From the observed gradients the supposition of a subsurface structure of fault character and the supposition of an anticlinal structure were equally probable.

Subsurface geological sections corresponding to the two suppositions were calculated, and, by a comparison of the calculated curvature curves with the observed mean curvature curve, preference was given to the supposition of a geological structure of fault character. Gravity map, gravity curves, and calculated subsurface sections are submitted.

(1633) THE INTERPRETATION OF TORSION-BALANCE DATA

By H. Rainbow

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 132.

The abstract published in this number of the Petroleum Times reads as follows:

In this highly mathematical paper the reader, states the author, is assumed to be familiar with the elements of torsion-balance theory and in particular with the calculation of gradients from subsurface data. For those who wish for practical results, irrespective of theory, the author devotes a portion of his paper to what he terms "Practical Rules." On the theoretical side he assumes that the underground disturbing masses consist of layers, each being of uniform known density and of approximately known thickness. On this assumption the author explains formulas showing how the subsurface can be calculated directly from the gradients.

G.A. 55

(1634) A TORSION-BALANCE MAP OF THE ZWISCHENAHN DOME IN OLDENBURG

By F. Kaselitz

The Petroleum Times, London, vol. 30, no. 759, 1933, p. 178.

The abstract published in this number of the Petroleum Times reads as follows:

> By the courtesy of Mr. K. F. Hasselmann, manager of the North European Oil Corporation, of Hanover, the author gives a detailed torsion-balance map of the Zwischenahn dome in Oldenburg, northwest Germany. This dome was found by torsion balance based on the theory that the "Aller-line" -- structural trend known from the salt -- and the oil district of Hanover continue to northwest Germany. The dome is characterized by the existence of a circular lake on top of the structure -- the "Zwischenahner Meer". The torsion-balance survey showed the lake not at the center of the structure but situated on the northeastern end of a salt mass, about 10 to 12 kilometers long and 4 to 5 kilometers wide, characterized as a big gravitational minimum.
>
> The accuracy of the gradients is strongly influenced by irregularities in the shallow subsurface, especially by the occurrence of extended layers of peat. These irregularities were partly eliminated by shortening the station distance.
>
> In spite of the irregularities the construction of lines of equal gravity gives a clear idea of the elongated form of the dome. It strikes NE-SW, the long flanks being remarkably straight. The small SW. flank is very flat, the NE. and NW. flanks are probably steep. The northeastern part, where the lake is situated, is gravitationally and tectonically apparently more disturbed. The total value of the deepest part of the minimum, situated in 5 kilometers southwest of the lake, amounts to $4 - 5.10^3$ c.g.s.
>
> Assuming the difference in specific gravity between salt and bedrock as 0.1, theoretical calculations suggested a probable depth of the salt surface of 600 meters or deeper. The dome was proved by well "Ohrwege No. 1," on the southwest end of the deepest part of the minimum, and the salt was found at 547 meters with a thin cap rock (anhydrite) of 26 meters. The map is a contribution for the study of detail measurements, as gravitational measurements, when applied to regional problems, are most effective.

(1635) GRAVIMETRICAL INVESTIGATION OF NORTH GERMAN SALT DOMES AND OIL DEPOSITS

By Friedrich Breyer

The Petroleum Times, London, vol. 30, no. 760, 1933, p. 223.

The abstract published in this issue of the Petroleum Times reads as follows:

> The mathematical treatment of gravimetrical measurements demands exact knowledge, by no means always available, of the density of the subsurface strata in question. The assumptions concerning the densities of the covering strata having to allow for rather considerable fluctuations, it is an advantage to be able to survey at the one time the influence of the varying differences in density. The author gives a diagram portraying a plane in which the possible solutions are indicated, permitting the checking of torsion-balance measurements across vertical faults. The diagram is founded on three main assumptions. The first, applicable to many problems in North Germany salt domes, is that in a horizontal direction the profile of the body examined is the same over a great distance. The second assumption is that the mutual surfaces of bodies of different weight run vertically, mainly applicable to greater tectonic disturbances, as well as to the impinging surfaces of salt and adjoining formation. The third assumption is that the other flank of the dome is far enough away not to influence the values (especially those required to establish the diagram) of the gravimetrical relations of the flank under examination. The validity of these premises is proved by the author.

2. MAGNETIC METHODS

(1636) FAR EASTERN RAND MAIN REEF DEVELOPMENTS

Editorial note

The Mining and Industrial Magazine of Southern Africa, Johannesburg,
vol. 16, no. 11, 1933, pp. 401-403.

Based on the magnetometric survey the presence of a stratum parallel and similar to that of the Lower and Upper Witwatersrand beds could be proved along a large section of the area lying between Leslie and Bethal and the extensions thereto toward Standerton.

Upon reference to the accompanying plan and section of the area prospected the author expresses the possibility of visualizing the enormous extent of this prospective new gold field, which promises to become a new Rand with a line of sub-Main Reef outcrop extending for well over 30 miles.— W. Ayvazoglou.

(1637) DER STAND DER MAGNETISCHEN AUFNAHME EUROPAS

(STATE OF MAGNETIC SURVEY IN EUROPE)

By Alfred Nippoldt

Mitteilungen des Reichsamts für Landesaufnahme, Berlin, vol. 8, no. 3, 1932/33, pp. 191-205.

After a brief historical outline on the magnetic measurements in Europe Nippoldt discusses the purpose of the magnetic measurements in general, and finally he gives the results of these measurements, as accomplished in almost all the European countries.

The single maps published in various countries were combined; and the true course of the isomagnetic lines through all of Europe, reduced for the epoch 1921.0, was drawn by Nippoldt in his "Maps of the distribution of the earth magnetism and of its local disturbances in Europe" (Karten der Verteilung des Erdmagnetismus und seiner örtlichen Störungen in Europa) or briefly the "Europakarte" (map of Europe). The scale of the map is 1 : 6,500,000.--W. Ayvazoglou.

(1638) MAGNETIC ANOMALIES IN OIL FIELDS

By A. van Weelden

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 34.

An abstract of Van Weelden's paper is given in this number of the Petroleum Times. It reads as follows:

> Minima of the vertical intensity of the earth-magnetic field were observed over most oil fields in the North American Mid-Continent. Different interpretations in current literature usually deny the possibility that drilling equipment could be responsible for those observed anomalies. The present paper agrees with earlier publications in so far that the influence of a single well becomes negligible at distances of 250 to 500 feet but shows that the accumulated effect of the very large number of densely spaced wells in the Mid-Continental fields can explain quantitatively the observed data.
>
> A few remarks are made regarding the method of computing the theoretical influence of casing. For the Healdton field in Oklahoma the influence of all wells is computed and shown to be of the same magnitude as the observed local anomalies. For the Hewitt field in Oklahoma some figures are quoted, showing that, even when a very high difference in susceptibility is assumed for the different beds, the magnetic anomaly caused by the tectonics of this strongly-folded field is still negligible compared to the influence of well casing. In other fields of the Mid-Continent folding is usually

less steep and the tectonical influence consequently smaller, whereas well spacing is denser in some of the Oklahoma fields, which naturally increases the magnetic effects of the production equipment. An exception must be made for fields such as Robertson, Okla., and the different pools connected with the Amarillo Mountains in the Panhandle of Texas, because these fields have a core of igneous material which has a decided influence on the magnetic field. An attempt to compare a survey over a well-developed field with a survey made over the same area before development is briefly discussed.

(1639) MAGNETIC MEASUREMENTS IN GERMAN OIL-BEARING STRATA

By H. Reich

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 131.

The abstract of Reich's paper appearing in this number of the Petroleum Times reads as follows:

> Only magnetic measurements of a high order of accuracy may be used for geologic interpretation in sedimentary regions. At any rate, artificial disturbances by steel or iron masses have to be carefully avoided. To get correct values observations must be made at least several hundred meters from the casing of individual boreholes, e.g., wildcats, and about 1 km from mines, shafts, and operating oil fields.
>
> The anomalies of the earth-magnetic field in Germany which are induced by sediments (particularly salt) according to the author's experience do not exceed values from 10 - 15 gammas. Therefore, accurate information on sedimentary structure can hardly be expected.
>
> However, those regional magnetic anomalies which may be interpreted as affected by crystalline basement rocks (igneous intrusions, as a rule) are of major importance. As magnetic rocks are of high density and offer high resistance to elastic or nonelastic deformation, areas of positive regional magnetic anomalies will show mechanical reactions different from those of the adjacent sedimentary rocks; in periods with prevailing tensional stress they show a tendency toward subsidence (augmented sedimentation), whereas in periods of compressive stress they are, as a rule, tending to uplift (diminishing sedimentation).
>
> Structurally the edges of the magnetic disturbing bodies (subsurface limits of rocks with different mechanical behavior) are to be considered as areas favorable to the development of structural dislocations of various type (particularly thrust-faulting, salt plugs, etc.). Various structural features of Germany are discussed in the light of the above considerations.

(1640) REGIONAL MAGNETIC ANOMALIES IN CENTRAL GERMANY

By P. von Zwerger

The Petroleum Times, London, vol. 30, no. 759, 1933, p. 181.

The abstract published in this number of the Petroleum Times reads as follows:

> The discovery of the Volkenroda oil field reopened the discussion of the structure of the Paleozoic floor in the area between the Thuringia uplift and the Harz Mountains of Germany. This question was particularly discussed by Von Freyberg in 1922 and H. Stille in 1930. Stille showed that there are important relations between the Variscan, Alpine-type orogeny and the Upper Carboniferous - Lower Permian epirogeny. His investigation showed that rises in the oil crystalline floor have predetermined the zones of rejuvenated uplifting. The undulations of "Zechstein" time to a great extent were equally strongly influenced by the structure of the pre-Permian floor. These natural conditions suggested a regional magnetic survey of the territory between the Thuringia uplift and Harz Mountains. The author gives a map illustrating the regional magnetic anomalies discovered by this survey and describes the relations of these anomalies to the crystalline structural axis and to Mesozoic "Saxonian" mountain building. The most important of the anomalies described in this paper show disturbances of 100 to 300 gammas, the Brocken axis one of only 60 to 80 gammas. The general strike of the magnetic axis if "erzgebirgisch" (SW - NE), with the exception of the Wiehe anomaly in the Unstrut Valley. The crystalline swells, generally consisting of magnetic intrusions, are building up the frame ("Rahmen") of the "Saxonian" block faulting of Mesozoic-Cenozoic time.
>
> The source rocks of the Middle "Zechstein" are assumed to be deposited in the geosynclines between the crystalline bridges, in accordance with the views of Heidorn and Schlueter. Their edges -- in particular when crossed by anticlines with "Hercynian" trend (NW - SE) -- offer the relatively greatest probability of commercial oil accumulation, as is the case at Volkenroda.

(1641) GEBIRGSBAU UND ERDMAGNETISMUS AUF DER BALKANHALBINSEL

(MOUNTAIN STRUCTURE AND TERRESTRIAL MAGNETISM IN THE BALKAN PENINSULA)

By Robert Schwinner

Gerlands Beiträge zur Geophysik, Leipzig, vol. 39, no. 2/3, 1933, pp. 263-284.

Measurements of terrestrial magnetism have been carried out in the Balkan Peninsula since 1917-18. Measurements of declination, inclination, horizontal intensity, and vertical intensity were made at 141 stations (a list of stations showing the data is added). Geological interpretation is based on these data.

A general conclusion is drawn that notwithstanding the numerous local auses of disturbances and the insufficient number of stations observed (the verage distance between the stations was 50 kilometers) close correlation be-ween the magnetic elements and the course of the great mountain ranges was stablished definitely.--W. Ayvazoglou.

(1642) UNE NOUVELLE MÉTHODE POUR LES MESURES MAGNÉTIQUES TRÈS PRÉCISES

(A NEW METHOD FOR MAKING VERY ACCURATE MAGNETIC MEASUREMENTS)

By Th. Koulomzine and N. Bondaletoff

Annales de l'Office National des Combustibles Liquides, Paris, vol. 8,
no. 3, 1933, pp. 549-558.

In this article the authors examine a method by which the accuracy of easurements made by magnetic balances can be improved considerably and can reach a value less than 1 gamma. The method is to be applied especially at the base stations where a great accuracy is important. The method consists mainly of using two instruments by which strictly simultaneous measurements are made. In this way, according to the authors, diurnal variations are eliminated.

A few examples of the application of the new method are given, and in the opinion of the authors the results obtained confirm their theoretical considerations.--W. Ayvazoglou.

(1643) STRUCTURAL TRENDS IN FLORIDA

By W. P. Jenny

The Oil Weekly, Houston, vol. 71, no. 3, 1933, pp. 23-26.

The geology of Florida is briefly discussed from the point of view of oil possibilities. It is pointed out that although the stratigraphy does not definitely condemn commercial oil occurrences, especially in the western part of Florida, the regional structures so far outlined are not favorable to oil accumulations.

By means of the magnetic vector method a number of regional anticlinal trends have been found in the basement and probable also in the overlying sedimentaries. These have a northeast-southwesterly direction in the central part of Florida and an east-westerly direction in the western and southern parts. These regional structural trends seem to be connected with the Appalachian orogeny and may have economic interest.

The principle of the magnetic vector method is described. The local magnetic vectors have been computed by deducting the "normal" values of the earth's magnetic field from the absolute measurements, at Coast and Geodetic

Survey stations, of the declination and the vertical and horizontal magnetic intensities. The differences between the absolute and the "normal" vertical and horizontal intensities have been combined into a vector triangle indicating the direction and intensity of the magnetic force as due to local anomalies. The vector triangles have been plotted on the map by turning the triangle through 90° around the horizontal component into the plane of the map.--Author's abstract.

3. SEISMIC METHODS

(1644) APPLICATION OF THE THEORY OF SURFACE WAVES FOR THE SOLUTION OF H. LAMB'S PROBLEM (IN RUSSIAN)

By S. Sobolev

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 18, 1932, 41 pp.

In the article "On the Propagation of Tremors over the Surface of an Elastic Solid" (Phil. Trans., vol. 203 A, 1904, p. 3) H. Lamb investigates the problem of the propagation of surface waves.

In this article Sobolev gives a mathematical discussion of the problem, in which he examines the disturbance propagated in a half-space as caused by a sum of waves, that is, the disturbance caused by a complex of surface waves.--W. Ayvazoglou.

(1645) CONCERNING AN APPLICATION OF THE SURFACE-WAVE THEORY (IN RUSSIAN)

By E. Naryshkina

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 19, 1932, 39 pp.

The theory of surface waves developed by Sobolev (see the preceding article) is applied by Naryshkina for the solution of the following problem: A solid, elastic half-space is bordered, along a plane, with an elastic compressible liquid by which the other half of the space is filled up. A certain force is acting perpendicular to the surface of separation. The question is to determine the displacement of the particles of the media of which the two half-spaces are composed. In the method applied the author assumes that the disturbances being propagated within the two half-spaces consist of a sum of surface waves which are propagated with different velocities and are reflected from the plane of separation at different angles. The laws of reflection of the surface waves are determined for both the half-spaces.

The displacements of the particles within the media were determined, based on Kupradze and Sobolev's work (see Geophys. Abstr. no 36, p. 425) who, the conditions being the same, determined the displacement of the particles located on the surface of separation.

In conclusion the author examines some results concerning the direction f the propagation, as well as the origin of new phases.--Author's abstract ranslated by W. Ayvazoglou.

(1646) SUR UNE MÉTHODE NOUVELLE DANS LE PROBLÈME PLAN DES VIBRATIONS ÉLASTIQUES

(CONCERNING A NEW METHOD IN THE SURFACE PROBLEM OF ELASTIC VIBRATIONS)

By V. Smirnov and S. Sobolev

Académie des Sciences de l'U.R.S.S. Publicationsof the Seismological
Institute, Leningrad, no. 20, 1932, 37 pp.

In this article the authors examine a new method by which some of Lamb's roblems can be solved by very simple operations. Besides, the new method erves also as a means for determining the displacements occurring not only n the surface of a half-space but also within this half-space.

The essential point of the method consists of transforming the problem f three independent variables into a problem containing only one or two ndependent variables.

A mathematical discussion is given.--W. Ayvazoglou.

(1647) ÜBER DIE SCHWINGUNGEN DES FESTEN ELASTISCHEN HALBRAUMES DER LÄNGS DER EBENE MIT EINER ELASTISCHEN KOMPRESSIBLEN FLÜSSIGKEIT GRENZT

(ON THE OSCILLATIONS OF A SOLID ELASTIC HALF-SPACE WHICH BORDERS ALONG A HORIZONTAL SURFACE WITH AN ELASTIC COMPRESSIBLE LIQUID)

By E. Naryshkina

Académie des Sciences de l'U.R.S.S. Publications of the Seismological
Institute, Leningrad, no. 21, 1933, 40 pp.

For the solution of the oscillation of the solid elastic half-space ordering the elastic compressible liquid for a plane case the author applies he new Smirnov and Sobolev method (see the preceding article). In this dis- ussion the author also examines the following cases: (1) When the source of he longitudinal oscillations is situated within the solid medium; (2) when he source of the longitudinal oscillations is situated within the solid edium; and (3) when the source of the oscillations is situated within the iquid.

The dislocation of the particles lying within the solid medium, as well s the liquid medium, is determined for all three cases.

Detailed mathematical discussion is given.--W. Ayvazoglou.

(1648) SUR L'APPLICATION DE LA MÉTHODE NOUVELLE À L'ÉTUDE DES VIBRATIONS ÉLASTIQUES DANS L'ESPACE À SYMÉTRIE AXIALE

(ON THE APPLICATION OF A NEW METHOD FOR STUDYING THE ELASTIC VIBRATIONS IN AN AXIALLY SYMMETRICAL SPACE)

By V. Smirnov and S. Sobolev

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 29, 1933, 49 pp.

In their previous work, "Concerning a New Method in the Surface Problem of Elastic Vibrations" (see citation 1646), the authors considered the elastic vibrations for a plane. In this article the authors use the results obtained in the previous investigation to solve the problem of propagation of the elastic vibrations in an axially symmetrical space.

Mathematical discussion is given.--W. Ayvazoglou.

(1649) SEISMOMETRICAL INVESTIGATION OF SAWMILLS "26" AND "A" IN THE REGION OF ARKHANGELSK (IN RUSSIAN)

By D. Kirnos

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 30, 1933, 18 pp.

Investigations were carried out in 1931 with a view to finding the cause of the oscillations of the ground which became dangerous to the buildings after 4 of the 8 saw frames were replaced by those working at a higher speed, up to 345 revolutions per minute. No effect was produced on the ground by the previous running of the saw frames at a speed of 275 to 290 revolutions per minute. Vertical and horizontal seismographs with optical registration were used.

It was established that the ground oscillated violently when the saw frames were run at a speed of 340 to 350 revolutions per minute.

The geological structure of the ground is shown in a figure. The results of measurements are represented by seismograms and curves.--W. Ayvazoglou.

(1650) GEOLOGICAL CONDITIONS OF THE ZANGEZUR EARTHQUAKE OF APRIL 27, 1931 (IN RUSSIAN)

By G. Gorshkov

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 31, 1933, 25 pp.

A special Zangezur expedition was sent to the region of the earthquake. The results of the work of this expedition will be published in a series of the Publications of the Seismological Institute. The present paper deals with the geological conditions of the area.

Geographical and geological data and a seismotectonic map with isoseists of the region are given.--W. Ayvazoglou.

(1651) GEOPHYSICAL EXPLORATION

Editorial note

National Oil Scouts Association of America, Houston, Year Book 1933, pp. 138-139.

Under the heading "Geophysical exploration" the author gives a brief description of this work carried out in the Gulf Coast during 1932. According to the author, virtually seismic methods only were applied, and almost all the seismographic work done in the Gulf Coast was by the reflection method.

So far as geophysical work is concerned the author divides the region into two areas, that commonly referred to as the "salt dome area" and that termed the "trend area". Since the reflection method has been adapted for contouring deep-seated structures, virtually the entire "salt-dome area" is being reworked in a search for structures similar to those now producing at Buckeye in Matagorda County, at Pledger and Manvel in Brazoria County, and at Myakawa in Harris County, Tex. The "trend area" is that adjacent to the "salt-dome area" on the north where the Jackson and Claiborne formations are found at a depth from which oil and gas can be produced economically.--W. Ayvazoglou.

(1652) MAPPING OF GEOLOGICAL STRUCTURE BY THE REFLECTION OF ELASTIC WAVES

By F. Goldstone

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 30.

According to the abstract of Goldstone's paper given in this number of the Petroleum Times the author describes the utilization of the reflected elastic waves in structure mapping. The usual field procedure is discussed, and examples of typical seismograms permitting mapping by correlation are reproduced. The results of such a survey in Oklahoma are given. Examples of typical seismograms from which interpretation must be derived by the dip method are reproduced, and the graphical method of obtaining the reflecting plane is explained. The conclusion is drawn that many structural problems confronting the petroleum geologist can be solved by the two methods of reflection shooting outlined in the article.—W. Ayvazoglou.

(1653) A SEISMIC METHOD OF MAPPING ANTICLINAL STRUCTURES

By J. H. Jones

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 132.

The abstract of Jones' paper is published in this issue of the Petroleum Times. It reads as follows:

> A method of mapping anticlinal structures is described. Several "time profiles" across the structure are determined by the arc method of surveying. The observation stations are arranged at equidistant points on an arc of a circle, and the explosion is fired at the center of the circle. The "travel times" of the pulses are measured accurately at each station and plotted against the position of the arc. This time curve gives directly a qualitative picture of the underground structure.
>
> The arc time profiles are linked together with longitudinal "time profiles" along the crestal region of the structure. It is shown in the paper that the expression for the "travel time" at any point can be put in terms of the normal depth H at the point in the form
>
> $$t = Ko + \frac{S}{VL} + kK,$$
>
> where Ko is a constant, the value of which depends on the depth at the shot point, S is the total distance along the surface of the structure between the feet of the normals from the shot point and the observation station, and k is another constant the value of which depends on the elastic constants of the overburden.
>
> It is also shown how all the observations can be reduced to a common datum point and the construction of the "isochron" map is explained. The depth contours can be determined from the time map by a simple geometrical method.

(1654) A NEW SHOCK MEASURER FOR SEISMIC ACCELERATION CURVES

By Richard Ambronn

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 132.

An abstract of this paper is published in this number of the Petroleum Times. It reads as follows:

> It is first shown why seismographs, which record the acceleration of the ground, are particularly suited to prospecting work. Instruments which utilize the piezo-electric properties of certain crystals prove specially useful for exactly recording the acceleration curves, on account of the suppression of the natural vibrations and damping arrangements.
>
> Several types of a seismograph constructed on this principle are described and explained by illustration.

(1655) BERICHT ÜBER DIE I. INTERNATIONALE TAGUNG DES WISSENSCHAFTLICHEN BEIRATS DES SEISMOLOGISCHEN INSTITUTS DER AKADEMIE DER WISSENSCHAFTEN DER U.S.S.R.

(REPORT ON THE FIRST INTERNATIONAL SESSION OF THE SCIENTIFIC COUNCIL OF THE SEISMOLOGICAL INSTITUTE OF THE ACADEMY OF SCIENCES OF THE U.S.S.R.)

Issued by P. Nikiforov.

Académie des Sciences de l'U.R.S.S. Publications of the Seismological Institute, Leningrad, no. 32, 1933, 178 pp.

In this volume Nikiforov, who is the director of the Seismological Institute, gives a detailed report on the International Session held in various parts of the Soviet Russia from September 2 to September 24, 1931. In opening the session, Nikiforov formulated in his address the main problems to be discussed, as follows:

1. Modern geotectonic theories, their physicomechanical principles, and the corresponding conclusions on the seismism in single parts of the U.S.S.R., as well as their causes.

2. Principles of the dynamics of construction as a new technical branch of knowledge and its application for earthquakeproof building in the industrial regions of the U.S.S.R. affected by earthquakes.

3. Laws concerning the propagation of elastic waves in limited media and their application for determining the structure of the earth's crust, as well as for prospecting.

The following papers were presented:

1. Born, A., Zum Problem der Glazial-Isostasie (Contribution to the Problem of the Glacial Isostasy).

2. Kossmat, Fr., Tektonische und geophysikalische Phänomene in der Ferghana-Region, Zentralasien (Tectonic and Geophysical Phenomena in the Ferghana Region, Central Asia).

3. Born, A., Zum Problem der Vertikalverschiebungen grosser Schollen (On the Problem of the Vertical Dislocation of Large Masses).

4. Vening-Meinesz, F. A., Bemerkungen angesichts des Themas: "Moderne geotektonische Theorien, deren physiko-mechanische Grundlagen, samt entsprechenden Schlussfolgerungen über Seismizität" (Remarks concerning the theme: "Modern Geotectonic Theories, Their Physicomechanical Principles, and Corresponding Conclusions on Seismism").

5. Stille, H., Oro- und epeirogenetische Bewegungen der Erdkruste im Zusammenhang mit der Seismizität Zentralasiens und Norddeutschlands (Orogenetic and Epeirogenetic Movements of the Earth's Crust in Connection with the Seismism of Central Asia and North Germany).

6. Mushketoff, D. J., Die nächsten Aufgaben der seismologischen Forschung (Future Problems of Seismic Investigation).

7. Zschocher, W. O., Grundlagen der Baudynamik und ihre Anwendung zum antiseismischen Aufbau in seismischen und industriellen Gebieten der U.S.S.R. (Principles of Structural Dynamics and Its Application in Earthquakeproof Buildings in Seismical and Industrial Regions of the U.S.S.R.).

8. Zawriew, D., Die Arbeiten des transkaukasischen Bautechnischen Instituts (Works of the Transcaucasian Institute of Civil Engineers).

9. Kupradze, V. D., Über die Fortpflanzung der elastischen Schwingungen in festen Medien (On the Propagation of Elastic Oscillations in Solid Media).

10. Rothé, E., Rapport sur la propagation des ondes séismiques à courte distance (Report on the Propagation of Seismic Waves at Short Distances).

11. Sobolev, S. L., Sur l'application de la théorie des ondes planes à la solution du problème de Lamb (On the Application of the Theory of Plane Waves to the Solution of Lamb's Problem).

12. Naryschkina, C. A., Die Uller'schen Arbeiten aus dem Gebiete der Wellenkinematik (Uller's works on the problem of wave-kinematics).— W. Ayvazoglou.

4. ELECTRICAL METHODS

(1656) STRUCTURAL INVESTIGATIONS BY ELECTROMAGNETIC METHODS

By K. Sundberg and H. Hedström

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 29.

An abstract of Sundberg and Hedström's paper is published in this issue f the Petroleum Times.

The authors give first a short review of resistivity methods applied to tructural studies of oil fields. They continue with a description of the lectromagnetic method by which alternating electric current is caused to low along the "electric keybeds" of the surface through electromagnetic nduction from a long wire on the surface. A more technical part of the aper follows, dealing with the physical and mathematical foundations of the lectromagnetic method.--W. Ayvazoglou.

(1657) ELECTRICAL CORING: ITS APPLICATION IN ROUMANIA IN 1931-32.

By C. and M. Schlumberger

The Petroleum Times, London, vol. 30, no. 756, 1933, p. 30.

According to the abstract published in this issue of the Petroleum Times he authors explain the technique of the electrical coring, illustrating his by detailed description of the application of electrical coring in oumania since February 1931. Statistics concerning the development of lectrical coring in Roumania are then given, together with an indication of he economic advantages derived from this new technique. The paper ends with general discussion of the role electrical coring could play in the future.-- . Ayvazoglou.

(1658) ACCURACY ATTAINED BY ELECTRICAL CORRELATION IN DRILLING WELLS

By T. Sutton Bowman

The Petroleum Times, London, vol. 30, no. 759, 1933, p. 181.

The abstract published in this issue of the Petroleum Times reads as ollows:

> The paper gives the results of a comparison of the accuracy of "electrical coring" in oil wells with the normal correlation (including micropaleontological and micropetrological) methods. The results show that although the combination of the older methods still gives the most accurate results the accuracy of the electrical method compares quite favorably. The most advantageous method of utilizing electrical coring is discussed.

It is pointed out that electrical coring does not replace ordinary coring but can be used as an adjunct to the latter by filling in details between depths cored, by indicating where ordinary coring should commence, and by allowing a complete picture of each well to be utilized in working out the tectonics of a field.

(1659) THE LIMITATIONS OF GEOPHYSICAL METHODS AND AN ELECTROCHEMICAL METHOD FOR DETERMINING GEOLOGICAL FORMATIONS

By Oscar Weiss

The Petroleum Times, London, vol. 30, no. 759, 1933, p. 182.

An abstract published in this number of the Petroleum Times reads as follows:

The paper deals generally with the standard methods of geophysical survey, drawing attention to their several advantages and disadvantages. An outline is then given of a newly developed electrical method, based on the simultaneous measurement of an input current and the resultant polarization current set up at the junction of two beds of different composition. These currents are separately recorded by galvanometers on a moving film against time marks accurate to 10-th seconds. From an analysis of these records in terms of the time factor for different electrode spacings, determinations can be made as to the depth of the various formation junctions. The important features of the new method are: (a) An electrical method dependent, not on conductivity, but on the chemical composition of the strata. (b) Records can be obtained up to depths of 6,000 feet with an input current of only 1-2 watts. (c) The screening effect which limited the older methods in many cases is almost entirely eliminated.

(1660) THE ELECTROMAGNETIC TELECLINOMETER AND DIPMETER

By C. and M. Schlumberger and H. G. Doll

The Petroleum Times, London, vol. 30, no. 759, 1933, p. 184.

The authors' abstract, published in this number of the Petroleum Times, reads as follows:

The electromagnetic teleclinometer permits the determination of the angle of inclination of the axis of a drill hole in relation to the verticale, and of the azimuth of this inclination in relation to the magnetic north. It is based on the use of an induction compass worked by an electric motor, and of an electromagnet supported by a cardan suspension whose magnetic field influences the coil of the compass in proportion to the inclination. The apparatus, whose diameter is 10 cm, is lowered into the drill hole by means of a cable comprising three insulated conductors, and the measurements are made at the surface by means of a potentiometer. This is described by the author, who states that the measurements are extremely rapid, lasting less than a minute at each point, so that 1,000 meters of drill hole can be surveyed in about half an hour. The measurements are accurate to within half a degree, which means that the bottom of a well 1,000 m deep can be located to within 8 meters horizontally.

The dipmeter is an improvement on the teleclinometer, which consists in the addition to this latter apparatus of an extension comprising a pole for sending current into the ground and measuring electrodes. These latter permit the measurement of the equipotential surfaces induced by the passage of the current, from which can be deduced the direction of the dip of the beds in relation to the magnetic north. These measurements are particularly easy in the case of steep dips, greater than 10 degrees, for example.

(1661) LA PROSPECCION DE MINERALES Y PETRÓLEO POR MEDIO DE LOS METODOS ELECTRICOS SUECOS

(PROSPECTING FOR MINERALS AND OIL BY SWEDISH ELECTRICAL METHODS)

Editorial note

Boletin Minero de la Sociedad Nacional de Mineria, Santiago,
vol. 45, no. 394, 1932, pp. 111-118.

Electrical methods of prospecting are briefly discussed and illustrated y examples in various parts of the world.--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1662) RADIOACTIVITY MEASUREMENTS OF NATURAL-GAS-BEARING STRATA

By J. B. Ostermeier

The Petroleum Times, London, vol. 30, no. 757, 1933, p. 83.

This issue of the Petroleum Times contains an abstract of Ostermeier's paper, which reads as follows:

To define the position and extent of natural-gas deposits it is necessary first to elucidate the tectonic relationships by means of preliminary geological investigations by the application of suitable methods of applied geophysics. The magnetic-measurement method, the cost of which and the time involved are relatively small, is especially suitable for the recognition of faults.

On the basis of the tectonic picture, the concentration zone of a natural-gas deposit, its position, and extent can then be determined within a part of the region, by radioactivity measurements; in comparison with the methods hitherto usually employed in radioactivity measurements the measurement of the potential fall within an ionization chamber sunk in the ground affords a great measurement. At Sisak in Yugoslavia, investigations of this nature were carried out in the oil field of Galdovo; a well deepened in the maximum of the potential fall was productive throughout for a long time; the position of the fault discovered by means of the radioactivity measurement coincided accurately with that ascertained by means of the magnetic measurement. As in the case of all the geophysical methods of investigation it is demonstrated by this example that it is not the technique of the measurement but the suitable interpretation of the physical phenomenon arising in the region under investigation which is in question.

(1663) FOLGERUNGEN AUS DEN BISHERIGEN FORSCHUNGSERGEBNISSEN ÜBER DIE KOSMISCHE ULTRASTRAHLUNG

(CONCLUSIONS DRAWN FROM THE EXISTING RESULTS OF INVESTIGATIONS ON THE COSMIC PENETRATING RADIATION)

By H. Rudolph

Gerlands Beiträge zur Geophysik, Leipzig, vol. 39, no. 2/3. 1933, pp. 260-261.

Observations on the Hess radiation, as well as the explanations of the mean diurnal variation of the earth's magnetism given by the author, do not agree with the existing theory that a very small velocity of the cathode rays reaches the earth from the sun.--Author's abstract translated by W. Ayvazoglou.

6. GEOTHERMAL METHODS

(1664) THE SIGNIFICANCE OF UNDERGROUND TEMPERATURES

By M. W. Strong

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 132.

The author discusses in turn the factors governing underground temperatures and draws a number of conclusions from his studies.

He next discusses chemical action, such as oxidization, hydration, pyritization, etc. The conductivity difference of rocks is shown to be a major cause of varying gradients, while the effect of diffusivity difference of rocks is important where rapid changes are taking place.

Rapid denudation tends to increase gradients, especially at the surface, while rapid deposition in geosynclines tends toward lower gradients. Squeezing out of incompetent strata also tends to give high gradients. Thrusts and the tectonic piling-up of strata both tend to lower the gradient by burying large masses of rocks at low temperature. As to the upward movement of rock, intrusive salt plugs and igneous masses will increase the gradient. This effect should be sought for only in the late Tertiary strata, unless very large masses have been involved. The effect of late emergence of strata after a long period beneath the sea is that the gradient may be lowered if emergence is in a warm region. The effect of direction of flow of underground waters is determined by topographic, stratigraphic, and tectonic factors, while Quaternary climatic changes may have an important effect on underground temperatures by altering the mean surface temperature.

Special factors are: (a) The loss of heat due to gas escape and oil seepages from oil fields, and (b) replacement of oil by incoming water. As to (a), this refers to loss by old seepages extending over geological time, and appreciable amounts of heat may be lost in this way whose effect will vary with the porosity and size of the reservoir. As to (b), if the influx is large and from below, increasing temperatures might accompany it; if slow and coming in laterally, this effect might be masked.--From the abstract published in the Petroleum Times, vol. 30, no. 758, 1933, p. 132.

7. UNCLASSIFIED METHODS

(1665) GEOPHYSICS AS AN AID IN THE SEARCH FOR OIL-BEARING STRUCTURES IN THE ARGENTINA

By Enrico Fossa-Mancini

The Petroleum Times, London, vol. 30, no. 757, 1933, p. 80.

The Petroleum Times gives an abstract of the paper, which is substantially as follows:

This paper, of great interest, summarizes the knowledge of oil-bearing structures in Argentina before the very recent decision to survey the State oil-reserve lands by geophysical means. Three areas are reported on, and the author concludes that if these examples are representative of the geological problems commonly related to the search for petroleum in Argentina the term "geophysical oil prospecting" must be considered an impropriety of language or an unrealizable dream. In Argentina it plays a very subordinate role; with such complex structures and frequent unconformities, geophysics is a very useful tool in the hands of an experienced geologist, but it could be a harmful weapon.

The authbr's experience in Argentina shows that geophysics can be very useful, even when the geological conditions are of considerable complexity, provided the instruments and methods appropriate for each be employed. As one often does not know previously which is the right method, it would be made convenient to spare the time to try all the methods at one's disposal. It is shown that the seismograph has given the required answer to certain geological questions in Campo Duran and the torsion balance in Pampa del Castillo and Comodoro Rivadavia.

(1666) GEOPHYSICAL MEASUREMENTS OF TECTONIC LINES OF DISTURBANCE IN OIL-BEARING STRATA

By E. Ebert

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 131.

The following abstract is published in this issue of the Petroleum Times:

> In dealing with subsoil series divided up by faulting and fissuring and overlain by younger sediments, faults can be detected by means of the radioactive method provided the thickness of the overlying strata is relatively small. The formerly disturbing influence of temperature, atmospheric pressure, sun radiation, of wind, and of primary radiation of the soil can be eliminated or separately determined. Reproducible and comparable values are obtained admitting qualitative and also partly quantitative conclusions as to the degree of fissuring and shattering of the subsoil. An accompanying map shows the section of an investigated oil region. The plotted faults were found only by radioactivity. From the way the producing wells and dry holes are distributed the influence of faulting may be recognized. When the thickness of the overlying strata is very great, the faults and also the way of folding in the subsoil may be determined by means of an electrical survey. In this case direction and angle of dipping also can be deduced.

(1667) GEOPHYSICAL EXPLORATION AND A PLAN FOR OIL-SURVEY PURPOSES

By O. Barsch

The Petroleum Times, London, vol. 30, no. 758, 1933, p. 132.

According to the abstract of Barsch's paper published in this issue of the Petroleum Times, the object of this work is to pick up all the prospective oil regions and to protect the oil industry from carrying out expensive surveys in areas of minor importance, such surveys being of higher practical value in the development of regions proved to be generally prospective. The individual oil companies cannot be charged with the preliminary work because they are not permitted to carry on geophysical investigations everywhere and because there has been little tendency to publish the results of investigations undertaken by individual companies in their own private interests.

Therefore, state and governmental organizations should plan and set up all the preliminary work.—W. Ayvazoglou.

(1668) THE REGIONAL TECTONICAL FEATURES OF THE WICHITA-ARBUCKLE MOUNTAIN REGION IN THE LIGHT OF GEOPHYSICAL OBSERVATIONS

By A. van Weelden

The Oil Weekly, Houston, vol. 70, no. 13, 1933, pp. 27-30.

The plateau region of the Mid-Continent is crossed by a pre-Carboniferous, intracontinental geosyncline. Subsequent folding in this area formed the well-known Wichita and Arbuckle Mountains, the Criner Hills, and the Red River Mountains. The exact relationship between the different elements has long presented a problem. The large number of wells drilled in search for oil and geophysical observations have, however, brought out certain relations which were not previously recognized. These relations, based on geological data only, were first published by Dr. Van Waterschoot van der Gracht in a paper for the Royal Academy of Science at Amsterdam. The present paper presents geophysical data in this region which consist of both magnetic and gravimetric observations. These data strongly support the idea of Dr. Van Waterschoot van der Gracht that the Arbuckles form a separate system of folds and are not connected with the Wichitas, as was formerly accepted. The Criner Hills Arch forms the frontal fold of the Wichita system and is separated from the Arbuckles by the Ardmore Basin. The geophysical evidence further indicates that the Ringling Deep is only a comparatively shallow feature but that, in the older formations, the Wichita Mountains continue uninterruptedly as the Walters Arch to the southeast and join the Munster Arch. The Frederick syncline and Marietta syncline separate the Red River Mountains and the Criner Hills Arch, respectively, from the main Wichita system but are interrupted by the Walters Arch. Both the Red River Mountains and Criner Hills Arch are relatively minor features developed on the flanks of the major mountain chain.

The interruption of the Ringling Deep, the magnetic and gravimetric culminations north of the Arbuckle Mountains and in Cooke County, Tex., and the off trend of the western portion of the Munster Arch may be considered as evidence in favor of the Hunton Arch, an older broad uplift, as conceived by Dr. Van Waterschoot van der Gracht.

To the west the decreasing magnetic anomalies may indicate the end of this mountain chain, while toward the east both geophysical and geological evidence is lacking.--Author's abstract.

(1669) INFORME SOBRE LAS INVESTIGACIONES GEOFISICAS EN ESPERANZA, CERCA DE CHILLAN

(INFORMATION CONCERNING GEOPHYSICAL INVESTIGATIONS IN ESPERANZA NEAR CHILLAN)

By H. Hornkohl, A. Graf, and H. Seblatnigg

Boletin Minero de la Sociedad Nacional de Mineria, Santiago, vol. 45, no. 394, 1932, pp. 221-224.

The article contains information on geophysical work by the authors from June 27 to August 12, 1931. Contents of the article:

1. Problems to be solved and the plan of the work.

2. Conditions of the work: Geological, topographic, climatic, and general.

3. Seismic investigations.

4. Magnetic investigations.

5. Electrical investigations.

Geological data (the existence of basalt layers, tuffs, and conglomerates) were proved by geophysical exploration. The anticline expected by Hardmann was not established, and no traces of oil could be found.--W. Ayvazoglou.

(1670) GEOPHYSICS APPLIED TO GEOLOGY

By Hans Lundberg and Folke Kihlstedt

Canadian Mining Journal, Gardenvale, Que., vol. 54, no. 9, 1933, pp. 337-342.

The purpose of the present paper is, according to the authors, to describe the operation of prospecting and to show the concordance of the diamond-drilling results with the predictions based on the electrical survey. The survey embraced German, Macklem, Stock, Taylor, and Bond Townships, situated some 23 miles slightly north of east of Porcupine. The conditions of the area investigated are described, and a table showing the resistivity of rocks in this region is given. The geophysical work included, first, a magnetic reconnaissance; then, an electrical reconnaissance, and last, an electrical detail survey. The magnetic survey (a Smith vertical balance with auxiliary magnets was used) required about 50 days; a contour map of the vertical field with intervals of 200 gammas and details of the magnetic survey are given in figures. The electrical work comprised 9 reconnaissance profiles between 2 and 3 miles in length and 25 detail profiles averaging about 2/3 of a mile each. The area covered was about 14 square miles of reconnaissance and 1¼ square miles of letail work. The survey lasted 65 days, including some special work of checking indications with other geophysical methods. The reconnaissance survey lisclosed the presence of a zone of schisted or sheared rock striking eastvest. The zone was traced across a number of profiles for about 2 miles and showed a width ranging from 200 to 2,000 feet. Electrical "Racom" profiles are given in a figure.--W. Ayvazoglou.

9. NEW BOOKS

(1671) Reich, Prof. Dr. H., Angewandte Geophysik für Bergleute und Geologen (Applied Geophysics for Mining Engineers and Geologists). Vol. 1, 147 pp., 74 figs. Price, R.M. 12.60. Vol. 2, will be issued later in 1933. Contents of the book: Vol. 1: A, General remarks on geophysical methods; B, geophysical investigation of areas for exploration of the structure of the earth in general; C, geophysical exploration of ore deposits. Vol. 2: Magmatic deposits; D, geophysical investigations in connection with technical purposes; E, conclusions.

(1672) Sieberg, Dr. A., Erdbebenforschung und ihre Verwertung für Technik, Bergbau, und Geologie (Earthquake Investigation and Its Application to Technology, Mining, and Geology). 52 figs. Second edition, 1933. Jena, Verlag von Gustav Fischer. Price, R.M. 3.20.

10. PATENTS

(1673) SEISMIC METHOD OF PROFILING GEOLOGIC FORMATIONS

Burton McCollum, Houston, Tex., assignor by mesne assignments,
to The Texas Co., a Corporation of Delaware

U. S. Patent 1,923,107 Patent issued August 22, 1933.

This invention relates to a seismic method of profiling the boundary surfaces of subterranean geologic formations.

The method consists in producing a seismic wave in the earth's substance, detecting the arrival of the wave at a point in the earth's substance, producing a seismic wave above said point, and detecting the arrival of the second mentioned wave at two spaced points adjacent to the first-mentioned point.

Claims allowed - 8.

(1674) ELECTRICAL PROSPECTING

Charles Rodney Nichols and Samuel Hathaway Williston, Dallas, Tex.

U. S. Patent 1,926,212 Patent issued September 12, 1933.

The present invention concerns primarily the location of deposits of oil by electrical methods. In the electrical determination of the subsurface composition of the earth the method consists in successively creating a potential difference between different groups of earth-surface portions regularly distributed over the field of exploration, locating a similar isopotential line for each group, and plotting said lines on a map of said field.

Claims allowed - 4.

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G.A. No. 56. UNITED STATES BUREAU OF MINES December 1933

Scott Turner, Director

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MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1675) SCHNEIDEN-UND UNTERLAGEMATERIAL BEI INVARIABLEN PENDELN FÜR RELATIVE SCHWEREMESSUNGEN

(MATERIAL FOR KNIFE-EDGES AND BEARINGS IN INVARIABLE PENDULUMS USED FOR RELATIVE GRAVITY MEASUREMENTS)

By O. Meisser

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 173-180.

Various materials are examined, and their values are calculated and shown in figures and tables. For practical application knife-edges or balls made from a very hard material resting on bearings the material of which has at least the same hardness must be used. If knife-edges made from a hard material rest on bearings of softer material or vice versa, considerable loss of energy at the point of the contact results.

Knife-edges manufactured from quartz glass or other brittle materials have notched profiles, as shown in a picture with 1,000-time magnification. Manufacturing of steel knife-edges can be, according to the author, improved considerably.--W. Ayvazoglou.

(1676) INVAR-MINIMUMPENDEL ALS MAGNETSTÄBE

(INVAR MINIMUM PENDULUMS AS BAR MAGNETS)

By Heinz Lettau

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 180-188.

A simple method for determining the magnetic moments and the susceptibilities of gravity pendulums is described and applied. Mutual magnetic influence, by using the two-pendulum method with bar pendulums, is derived theoretically and proved experimentally. The author proposes to provide the instruments of the kind examined with fixed deflecting needles the deflections of which give indisputable (usually very small) reductions of the relative gravity values.--Author's abstract translated by W. Ayvazoglou.

(1677) ZUR FLUTBEWEGUNG DER FESTEN ERDKRUSTE

(CONCERNING THE TIDAL MOVEMENT OF THE SOLID EARTH'S CRUST)

By E. Kleinschmidt

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 197-199.

In this article Kleinschmidt examines the value of the elevation of the earth's crust caused by the tides, as derived by Tomaschek and Schaffernicht in their article, Investigations Concerning the Temporal Changes of Gravity (See Geophys. Abst. No. 49, p. 807), which he considers to be too great.--W. Ayvazoglou.

(1678) DIE FLUT DER FESTEN ERDE

(THE TIDE OF THE SOLID EARTH)

By R. Tomaschek and W. Schaffernicht

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 199-204.

This article is written by the authors in connection with Kleinschmidt's article given above. The translation of the author's abstract reads as follows:

The results of measurements of temporal variations of the values of gravity made simultaneously in Marburg (on the Lahn) and in Berchtesgaden (distance, 500 km) are given. The amplitude of the variation of gravity ($\delta = 0.6$) is almost the same for both the places, but the phase displacement was established to be very strong and of opposite direction. This proved the existence of movements which differ greatly from the effects established so far theoretically. It is also shown that the objections made with regard to the results obtained are groundless.--W. Ayvazoglou.

(1679) DER ZUSAMMENHANG ZWISCHEN SPANNUNG UND VERFORMUNG BEI TEKTONISCHEN VORGÄNGEN

(RELATION BETWEEN THE STRESS AND STRUCTURAL FORMATION DURING THE TECTONIC PROCESSES)

By Sigismund Kienow

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 204-229.

The results obtained by V. Karman, Böckez, and others from experiments made on rocks are generalized by using the continuum-mechanics, so that they appear suitable for treating tectonic problems. In extrapolation for very small velocities the experience obtained from plastic clay is applied. With the aid of the results obtained in this way some phenomena known from geological field observations are reduced to physical problems, thus making the calculations possible. Finally, the formation of the graben as an example of plastic deformation in the earth's crust is discussed.--Author's abstract translated by W. Ayvazoglou.

(1680) DIE ERGEBNISSE DER ENTWICKLUNG DES SCHWERKRAFT-FELDES DER ERDE NACH KUGELFUNCTIONEN BIS ZUR 16 ORDNUNG

(THE RESULTS OF THE DEVELOPMENT OF THE GRAVITY FIELD OF THE EARTH ACCORDING TO THE SPHERICAL FUNCTIONS UP TO 16th DEGREE)

By F. Ackerl

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 263-275.

From the spherical functions developed of the gravity field of the earth given by the author, the undulations of the geoid, the apparent, and the true gravity disturbances are calculated according to Hopfner's method.--Author's abstract translated by W. Ayvazoglou.

(1681) RECENT DEVELOPMENTS IN GRAVITY APPARATUS

By William Bowie

Science, New York, vol. 77, No. 1995, 1933, pp. 308-310.

Developments in the gravity apparatus made by Brown and Lejay-Holweck are described. The most essential features of the known apparatus, as given by Bowie, are as follows:

1. The receiver supports are about in the same horizontal plane as the knife-edge on which the pendulum swings.

2. The oscillations of the pendulum are made to actuate a photoelectric cell, and the impulses are amplified until they operate the chronograph pen.

3. Most of the auxiliary parts of the gravity equipment are installed permanently in an automobile truck. These parts include the chronograph, radio apparatus used for receiving the signals, switchboard, batteries, etc. The only important part of the apparatus that needs to be taken out of the truck is the pendulum receiver.

4. The pendulum receiver is designed in such a way that the pendulum can be clamped in a safe position without removing it, after observations are made at a station. The receiver containing the clamped pendulum is then placed in an automobile truck and carried to the next station.

Bowie mentions a few other types of gravity apparatus which are in the process of development:

1. The apparatus of Fred E. Wright, of the Geophysical Laboratory of the Carnegie Institution of Washington;

2. An apparatus at the office of the Geodetic Institute at Potsdam, Germany;

3. A new type recently developed in Norway (see Geophys. Abs. No. 43, pp. 635 and 636).--W. Ayvazoglou.

(1682) MÉTHODES DES CORRECTIONS TOPOGRAPHIQUES ET CARTOGRAPHIQUES UTILISÉES EN PROSPECTION GRAVIMÉTRIQUE

(METHODS OF TOPOGRAPHIC AND CARTOGRAPHIC CORRECTIONS USED IN GRAVIMETRICAL PROSPECTION)

By C. L. Alexanian

Annales de l'office national des combustibles liquides, Paris, vol. 8, No. 4, 1933, pp. 645-679.

In this article the author examines the different methods applied in gravimetrical prospecting for topographic and cartographic corrections. Although not very exact, these methods can be accepted in practice for the solution of the question of the corrections mentioned. Alexanian examines the advantages and disadvantages of the various methods, reviewing them in chronological order based on original articles mentioned in the course of the discussion. In the first part of his work, published in this issue of the "Annales", the author examines the following methods:

A. Analytical Methods:

1. Eötvös method; remark concerning this method.

2. First Schweydar method; (a) Numerical determination of constants; (b) remark concerning first Schweydar method.

3. Second Schweydar method; remark concerning this method.

4. Heiland method; remark concerning Heiland's analytical method.

5. Author's method; remark concerning the method.

6. Bulluigi and Lenzi method: (a) practical application;

   (b) remark concerning Belluigi and Lenzi method.

The article is to be continued.--W. Ayvazoglou.

(1683) RESONANZMETHODE FUR DIE MESSUNG DER GRAVITATIONS - KONSTANTE MITTELS DER DREHWAAGE

(RESONANCE METHOD FOR MEASURING THE GRAVITATION CONSTANT BY THE TORSION BALANCE)

By Josef Zahradnicek

Physikalische Zeitschrift, Leipzig, vol. 34, No. 3, 1933, pp. 126-133.

The measurements of the gravitation constant are carried out by the resonance method, that is, by means of the oscillations a secondary torsion balance takes up in the periodically variable new torsion field of the primary torsion balance. The torsion balances used are described, and some measurements and photographic data of the exciting and the forced oscillations are given and discussed.

From the results of the measurements a conclusion can be drawn that the resonance method is suitable for measuring the gravitation constant owing to its simplicity and its clearness.--Author's abstract translated by W. Ayvazoglou.

2. MAGNETIC METHODS

(1684) MAGNÉTOMÈTRE INSENSIBLE AUX CHAMPS MAGNÉTIQUES TROUBLÉS DES GRANDES VILLES

(MAGNETOMETER INSENSIBLE TO THE DISTURBED MAGNETIC FIELDS IN LARGE CITIES)

By E. Thellier

Comptes rendus de l'Académie des Sciences, Paris, vol. 197,
No. 3, (July 17), 1933, pp. 232-234.

The article relates to an apparatus in which the effects of a constant variation of magnetic field produced during the daytime in large cities is eliminated.

The system consists of three parallel magnets, with magnetic moments, M, 2M, M, fastened horizontally to a glass rod suspended by means of a cocoon thread. The magnetic axis of the magnet 2M is of an inverse sense with regard to the two magnets M, and the two latter magnets are placed symmetrically with respect to the magnet 2M, one above and the other below it.

Such a system presents, according to the author, the following advantages:

1. It is astatic.

2. Most of the fields, constant or variable, which are not uniform, do ot affect it. In fact, all the nonuniform magnetic fields, the origins of hich are at a great distance in comparison with the distance between the agnets, will produce upon the mobile system a couple equal to zero.

3. It is symmetrical with regard to the main magnet 2M upon which the samples to be studied are expected to produce the effect.

The arrangement and the operation of the apparatus are briefly described.--W. Ayvazoglou.

(1685) A NEW WITWATERSRAND AREA EASTWARDS?

EDITORIAL NOTE

South African Mining and Engineering Journal, Johannesburg,
vol. 44, No. 2155, 1933, pp. 395-396.

Investigation carried on by magnetometric methods of prospecting beyond the Far East Rand give, according to this paper, promising results.

A section showing the probable position of the Witwatersrand beds below the overlying and comparatively shallow covering of more recent strata is given. The truth of the theory indicated is now being investigated by a magnetometric survey, and will later be tested by boreholes.--W. Ayvazoglou.

(1686) FAR EASTERN RAND DEVELOPMENTS

EDITORIAL NOTE

The Rhodesian Mining Journal, Johannesburg, vol. 7, No. 75, 1933, pp. 343-344.

The progress of the Far Eastern Rand area magnetic survey is mentioned. A diagram showing the Far Eastern Rand and Bethal synclinal basin of the Witwatersrand system, and a section showing the geological structure of the area are given.--W. Ayvazoglou.

(1687) FAR EAST RAND AREAS ("A") CO., LTD.

EDITORIAL NOTE

The Mining and Industrial Magazine of Southern Africa, Johannesburg,
vol. 17, No. 1933, pp. 19-20.

In this note the author discusses the progress made in proving extension of Witwatersrand beds in Bethal district. In the report on geophysical survey the following results of the magnetometric survey are mentioned:

Three teams of geophysicists are now busy with the investigation work, and up to the present seven main sections or transverse lines have been completed. Two of these lines are located in the area between Springs and the estimated position of the granite footwall to the East with the view to determining the character of the anomalies obtained from the strata in this East Rand basin and for comparison with those that will be met with in the Far East Rand area basin. The other six traverse lines which run to the East of the granite and in area controlled by your company, cover a total distance of approximately 70 miles, in which traverse length there were some 3,700 survey stations for magnetometric observation. In addition to this work, small traverse lines were made to determine the approximate strike directions of some of the beds which had given anomalies requiring further investigation.

The report concludes by expressing the wish that the geophysical work be expedited by the data obtained from boreholes, as these data coupled with the results of the geophysical observations should be sufficient to determine where the main drilling program should be carried out.--W. Ayvazoglou.

(1688) MAGNETOMETER WORK ADVANCEMENT DUE TO BETTER INSTRUMENTS AND TECHNIQUE

By L. Spraragen

The Oil and Gas Journal, Tulsa, vol. 32, No. 18, 1933, p. 37.

According to the author by far the greatest improvement in the magnetic method of exploration has been reached by the introduction by the Askania Corporation of a magnetometer using a moving system with negligible temperature coefficient.

Causes of the inaccuracy of the early magnetic surveys are briefly examined.--W. Ayvazoglou.

(1689) LABORATORY DETERMINATIONS OF THE MAGNETIC PROPERTIES OF CERTAIN IGNEOUS ROCKS

By A. F. Hallimond and E. F. Herroun

Proceedings of the Royal Society, London, Series A, vol. 141,
No. A 844, 1933, pp. 302-314.

An account is given of the magnetic properties of igneous rock specimens collected by H. M. Geological Survey. The rocks were taken from localities at which field surveys have been made with the magnetic vertical force variometer during the past few years. A group of several specimens was taken at each place in order to insure uniformity, and from one of these a 3.3-cm cube was cut for magnetic determination in the laboratory. The measurements, which were made by Professor Herroun, were obtained by placing the cube near a free suspended magnetized needle, in a partly neutralized field. The instrument was standardized by means of bars of known moment and by the time of swing. Susceptibility was measured by surrounding the cube with a coil.

Specimens from Leicestershire (Charnwood Rocks) gave low values, but a measurable degree of permanent magnetization and susceptibility was found for the Cleveland Dike and for the dike at Lornty in Perthshire. A method is developed for calculating the magnetic profile from the geological model, assuming uniformity of magnetization. Calculated and observed curves for the Lornty profiles show fairly good agreement; they indicate that the north side of the dike is south-polar, so that the magnetization appears to be in the opposite sense to that recorded for certain dikes in Germany, and does not coincide with that which would be produced by cooling in the earth's present field.--Author's abstract.

3. SEISMIC METHODS

(1690) ANALYSE D'ONDES DE RAYLEIGH

(THE ANALYSIS OF RAYLEIGH WAVES)

By Mr. and Mrs. H. Labrouste

Comptes rendus de l'Académie des Sciences, Paris, vol. 197,
No. 2 (July 10), 1933, pp. 176-177.

It is usually accepted that the seismograms recorded by a vertical seismograph contain Rayleigh waves only and do not contain Love waves. After a careful study of seismograms recorded by a Galitzine vertical seismograph, with a period of 12 seconds, at Abisco (Sweden) during the Formosa earthquake of September 1, 1922, the authors discovered the existence of a very small amount of component oscillations arriving successively in the order of the decreasing periods. A new interpretation of Rayleigh waves is discussed.--W. Ayvazoglou.

(1691) COMPOSANTES PERIODIQUES DANS LES ONDES DE LOVE

(THE PÉRIODIC COMPONENTS OF LOVE'S WAVES)

By Y. Labruste

Comptes rendus de l'Académie des Sciences, Paris, vol. 197,
No. 4 (July 24), 1933, pp. 344-346.

The author examines a method for separating Love waves from the Rayleigh waves by which the first are superposed at the beginning of an earthquake. Graphical reproduction of the results obtained and the corresponding velocities of the waves at the centers of each group are given.--W. Ayvazoglou.

(1692) ELASTIC PROPERTIES OF ROCKS AT AND NEAR THE EARTH'S SURFACE AND THEIR RELATION TO SEISMOLOGY

By W. A. Zisman

Gerlands Beitrage zur Geophysik, Leipzig, vol. 39, No. 4, 1933, pp. 408-425.

The investigation shows that for most rocks near the earth's surface the dynamically determined elastic constants differ greatly from the respective, statically determined elastic constants. The difference is a function of the porosity. Cracks and other cavities cause dispersion and absorption of elastic waves. In such porous material the group and wave velocities differ. The seismologist using artificial earthquakes measures group velocity. Comparison of the E (Young's modulus) and δ (Poisson's ratio), calculated from his wave velocities with the same constants determined in the laboratory, is least difficult with the most compact rocks. For them the agreement will be close, whether static or dynamic methods are used in the laboratory. For porous or loosely compacted rocks no dynamic laboratory method has yet been devised, and the static method is certain to give E and δ that are widely different from those seismically effective. On the other hand, the cubic compressibilities of even porous rocks, when "uncovered", do agree rather closely with the respective compressibilities computed from the velocities of the elastic waves in the field.

For thoroughly compact rocks, and for rocks at depth in the earth where the pressure insures freedom from cavities, it seems correct to treat them as homogeneous media obeying Hooke's law and possessing nearly, if not quite, the same static and dynamic constants.

The existence of strong anisotropy in surface rocks, especially those with distinct layering, has been shown by measurements of three different constants, Young's modulus, Poisson's ratio, and linear compressibility.--Author's abstract.

(1693) EINE ERDBEBENWARTE IM GEBIETE DER SCHWÄBISCHEN ALB

(A SEISMIC OBSERVATORY IN THE REGION OF THE SWABIAN ALB)

By W. Hiller

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 230-234.

A brief report on the present time knowledge concerning the seismic activity in the region of the Swabian Alb and the necessity of building an observatory in the alb is given. The location and the equipment of the new seismic observatory in Messtetten-Ebingen is described.--Author's abstract translated by W. Ayvazoglou.

(1694) TABLES FOR FACILITATING THE SOLUTION OF WIECHERT'S EQUATION

By P. W. Glover

Monthly Notices of the Royal Astronomical Society, London Geophysical
Supplement, vol. 3, No. 4, 1933, pp. 168-170.

These tables form the subject of the present paper, and the author hopes that they will be found useful as a supplement to the tables compiled by K. Zoeppritz in his Seismische Registrierungen in Göttingen im Jahre 1906 (Seismic Records in Göttingen Obtained in 1906) and published in the Nachrichten der königlichen Gesellschaft der Wissenschaften zur Göttingen, mathematisch-physikalische Klasse, 1909.--W. Ayvazoglou.

(1695) ÜBER ERDBEBENWELLEN. DIE SCHATTENWIRKUNG DES ERDKERNS FÜR DIE SEISMISCHEN RAUMWELLEN

(CONCERNING EARTHQUAKE-WAVES. SHADOW-EFFECT OF THE EARTH-NUCLEUS FOR SEISMIC SPACE-WAVES)

By Heinrich Jung

Nachrichten von der Gesellschaft der Wissenschaften zu Göttingen, Berlin,
No. 1, 1935, pp. 42-60.

The author shows that the existing assumption that a shadow-zone can be caused during the propagation of the elastic waves inside of the earth-crust only if the velocity of the kind of the wave under consideration decreases at a border-surface downward by leaps is not correct. Propagations of velocities were found which, although dispersing uninterruptedly as functions of the depth, produced shadows. The condition for the appearance of a shadow is given and from this the lower limit for the decrease of the velocity of the P-waves at the boundary of the earth-nucleus is derived. The author also shows that the well-known direct methods for calculation of the velocity from the travel-time curve cannot be applied in case of the appearance of the shadow, thus indirect methods must be used. In conclusion, corresponding problems of air-seismism and of radio telegraphy are discussed in general.--Author's abstract translated by W. Ayvazoglou.

4. ELECTRICAL METHODS

(1696) LES FLUCTUATIONS DU CHAMP ÉLECTRIQUE TERRESTRE

(THE FLUCTUATIONS OF THE TERRESTRIAL ELECTRIC FIELD)

By A. Duperier and G. Collado

Comptes rendus de l'Académie des Sciences, Paris, vol. 197,
No. 5 (July 31) 1933, pp. 422-423.

Based on the experiments carried out by the authors at the geophysical station Val-Joyeux, near Paris, and in Madrid, they established that the continuous fluctuations of the electrical field cannot be due to local irregular disturbances only. In most instances they must be attributed to a more ample phenomenon, such as, for example, worldwide variation of the terrestrial field.--W. Ayvazoglou.

(1697) LA ROUMANIE MINIÈRE

(MINING IN ROUMANIA)

By Ch. Berthelot

Extract from the "Memoires de la Société des Ingénieurs Civils de France,"
Paris, Bulletin March-April 1933, 64 pp.

Chapters 4 and 5 of this pamphlet are devoted to geophysical prospecting.

In Chapter 4, Methods of Locating Petroliferous Deposits in Roumania, Berthelot describes the principle of Schlumberger's resistivity method. As an example, the author discusses the measurements of the resistivities above the Aricesti anticline in Roumania. A map of this region showing the curves of equal resistivity is given.

In Chapter 5, Making Borings and Exploiting Petroliferous Wells in Roumania" - Berthelot explains the electrical coring. A few examples of its application in Roumania are given, and its importance for the exploitation of oil wells is emphasized.--W. Ayvazoglou.

(1698) RECHERCHE DU PÉTROLE PAR L'APPLICATION DE LA MÉTHODE DE LA CARTE DE RÉSISTIVITÉ DU SOL

(PROSPECTING FOR OIL BY THE APPLICATION OF THE METHOD OF THE GROUND-RESISTIVITY MAP)

By Ch. Berthelot

La Nature, Paris, No. 2911, Aug. 15, 1933, pp. 147-150.

Berthelot describes in this article the application of Schlumberger's method of the "resistivity map of the subsoil" which, according to his statement, is one of the methods used with the best success in Roumania. A resistivity map of the Aricesti anticline is given.

The second part of the article deals with "electrical coring." After a brief definition of the process, the author discusses a few examples of its application in Roumania. Diagrams are added.--W. Ayvazoglou.

(1699) NOUVELLE MÉTHODE DE PROSPECTIONS ÉLECTRIQUES

(NEW METHOD OF ELECTRICAL PROSPECTING

By E. A. Akerman

L'Écho des mines et de la métallurgie, Paris, vol. 61, No. 3149, 1933, pp. 496-499.

Different proceedings in electrical methods of prospecting are mentioned and criticized. To eliminate some disadvantages distinctive to the old methods, such as loss of time caused by placing the elctrodes and insulated cables, shifting of points of observation, influence of topography, etc., the author describes his new method, in which only one electrode is used. According to the author, this makes the use of insulated cables unnecessary, the instrument can be mounted in less than 30 minutes, and, moreover, the influence of the topography becomes minimal.--W. Ayvazoglou.

(1700) THE CALCULATION OF ELECTRICAL RESISTIVITY FOR A REGION UNDERLYING TWO UNIFORM LAYERS

By Irwin Roman

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, 1933, vol. 38, No. 2, pp. 117-141, and vol. 38, No. 3, pp. 185-202.

In this paper a complete series solution has been developed for the following problem, the boundaries being taken horizontally for definiteness. The upper and lower regions extend to infinity in three directions and are separated from each other by two parallel layers of finite thicknesses. A current source (or electrostatic charge) is located in the upper of the two layers. The potential is desired for every point of space.

To simplify the analysis it has been assumed that no two adjacent media have the same conductivity, but this restriction may be removed by separate analysis of the indeterminate forms. For the same reason it has been assumed that the layers actually exist or that each thickness is positive.

The potential has been assumed to be due to the original pole and sets of electric images, there being six sets, each with two parameters. The strengths and positions of the images have been determined to satisfy the usual boundary condition.

To facilitate the determination, auxiliary concepts and relations have been collected before the main problem has been attacked. The range of the counters has been restricted to the positive integers and a simplified notation adopted. Various transformation of series have been listed. The reflection-factor and reflection-complement have been defined and discussed briefly. The class and the order of an image have been defined and their uses indicated. The numbers of a certain set have been defined as distribution-factors and some of their more important properties have been considered. A table (1) shows their values for small elements. A simultaneous recursion-system in two variables has been solved for the general case, preparatory to its application in determining the images of classes above two.

The potentials must satisfy the boundary conditions expressed by equation (15). The structures of the potentials are shown by (18.1). The boundary conditions on the image strengths and positions are shown by (21) and also by (29) and (30), which lead to the simple equations (31) and (32) determining the image-strengths. The image-positions are given by equation (28).

The image-strengths are determined by class 1 and class 2 and for higher classes separately. For class 1 images equations (32) determine the strengths either directly or by recursion. For class 2 images equations (32) determine the strengths by reference to certain images of class 1. For images of classes above 2 the auxiliary recursion-system is directly applicable, utilizing certain images of classes 1 and 2. The image-strengths are summarized in a table (table 2).

Because of its practical importance the simple geophysical case has been studied in more detail. In this case the upper layer is taken as a perfect insulator and both current-pole (electrostatic charge) and potential electrode are taken at the upper surface (of the earth). For this case equation (59) expresses the potential as the sum of a normal potential, a primary anomaly, and a secondary anomaly. The normal potential is obtainable without difficulty, and the primary anomaly is the same as that examined in a previous paper. Thus, there is left only the secondary anomaly, which is evaluated in equation (61).

The results of the present paper reduce to those of the previous paper when the lower layer and the bed have the same conductivity. The results are in agreement with those of Ehrenburg and Watson in the five cases for which the two problems overlap. They also agree with the results of Hummel as far as these have been published explicitly.

The applications of the formulas have been indicated and disturbing factors defined. In particular, the case of two layers of the same thickness has been studied further, the results being given by equations (85.1), where the numerators have values given by equations (87). If, in addition, the bed is a perfect insulator the results are expressible in the simple form shown by equation (90.5). Finally, a numerical example is examined, checking the results against two curves published by Ehrenburg and Watson, the formulas being given by equations (91) andthe numerical values by table 3.

In closing, the writer expresses the hope that the tools developed in this paper will prove useful in further attempts to study the flow of currents in regions possessing distinct boundaries. It is hoped that the present analysis will open the way not only to a study of stratified media but also of regions containing bodies of finite forms, such as prisms and lenses of simple shape.--Author's abstract.

(1701) MESSUNG DER ELEKTRISCHEN LEITFÄHIGKEIT DER ERDE IN VERSCHIEDENEN TIEFEN DURCH DIE VON EINEN KREISSTROM INDUZIERTEN STRÖME (MIT VERMEIDUNG MERKLICHEN SKINEFFEKTS)

(MEASUREMENT OF ELECTRICAL CONDUCTIVITY OF THE EARTH AT VARIOUS DEPTHS BY MEANS OF CURRENTS INDUCED BY A CIRCULAR CIRCUIT, NEGLECTING THE SMALL SKIN EFFECT)

By W. Nunier

Gerlands Beiträge zur Geophysik. Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 4, 1933, pp. 370-391.

The author measured the vertical component of the magnetic field induced by an alternative current for the determination of the conductivity of the earth's crust at different depths. The primary field could be varied by altering the radius of the horizontal loop and by using frequencies ν from 25 up to 300 cycles per second. The specific resistance ρ of the earth in ohm-cm was calculated from Koenigsberger's formula (see Physik. Zeitschrift no. 31, 1930, p. 487).

As the skin effect does not show up in the results the magnetic vertical component may be calculated from the equation $H = 8.3 \times 10^{-9} \nu RJ \div \rho$, where R is the radius of the loop conveying current J (measured in amperes) for the primary field. The limits of application of the latter formula being checked by laboratory tests with a tank filled with salt water.--Author's abstract.

(1702) INDUKTIONSMESSUNG IM ZENTRUM EINER KREISSCHLEIFE ZUR LEITFÄHIGKEITSBESTIMMUNG IN DER ERDE. ERGÄNZUNGEN

(MEASUREMENT OF INDUCTION IN THE CENTER OF A LOOP FOR DETERMINING THE CONDUCTIVITY IN THE GROUND. SUPPLEMENTS)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 3, No. 4, 1933, pp. 392-407.

By using the central-induction method the resistance of the subsoil may be determined with greater accuracy as the depth increases (the method being good for a minimum depth of 20 meters), that is, by applying larger current loops and at decreasing resistance ($\leqq 300000\ \Omega$ for $l \leqq 10^2$m). Contrary to this the four-electrode method of Wenner (and Lee) suits better the smaller the electrode separation ($a \leqq 1000$ m) and the greater the resistance ($\geqq 5000\ \Omega$). The two methods complete each other; their combination allows us to determine the depth of the boundaries from the singular points (inflexion points, extreme points) of the curves, as well as to compute the resistances of the strata.

In chapters 4 and 5 this calculation has been worked out for the central induction method. Chapter 2 gives the calculation of the formula for the 90° component of the magnetic field at the center of the induction loop for the complete expression of the primary magnetic field due to the circular current; these calculations resulted in the improved value, 8.17, of the factor, instead of the previously determined 8.3. Chapter 3 gives the relation between the radius and the frequency under which no influence is effected by the skin effect and the 180° component. The influence of the wave-velocity may be neglected in this case. With the frequency n = 2 it is easy to reach a depth of 100 kilometers and even more. Chapter 6 deals with the combination of several loops (4) to eliminate the influence of the higher layers, thus emphasizing the effect of the deeper layers.--Author's abstract.

(1703) AUFSUCHUNG VON WASSER MIT GEOPHYSIKALISCHEN METHODEN

(PROSPECTING FOR WATER BY GEOPHYSICAL METHODS)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik. Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 3, No. 4, 1933, pp. 463-525.

Contents:

I. Introduction.

II. General geophysical points of view.

III. General remarks on geoelectrical methods in hydrology.

V. Principal geoelectrical methods in hydrology.

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2. Planimetric methods for the determination of the potential differences.

3. Induction methods.

. Auxiliary electrical methods in hydrology: (a) Resistance of single layers; (b) porosity of strata; (c) inflow of water; (d) dip of strata; (e) pursuit of water flows.

I. Electrical waves in hydrology.

II. Other auxiliary methods: (a) Determination of faults of different methods; (b) radioactive methods; (c) geophone; (d) instruments based on known principles; (e) auxiliary methods in arid climates.

III. Appendix.

Geophysical investigations must be preceded by the study of the region in question. The author divides the aims of the search for water in the following way:

1. Determination of the underground water and of its depth in humid climates (Central Europe, North America between 35th and 60th degrees of latitude), estimation of its resources, total size of the reservoirs, and quality of water.

2. Establishment of the course of the water or of its sources in this climate.

3. Finding of drinkable water in the arid climates.

4. Determination of the depth of the level of the underground water; estimation of its quality and amount.

5. Establishment of the courses of the sources in dry climates.

G. Salt water in connection with the oil-horizons. Depth of the level of the salt water, estimation of the content of salt and of the amount of the salt water.

The problems discussed are illustrated by examples.--W. Ayvazoglou.

(1704) ÜBER DIE HOMOGENITÄT DES MAGNETFELDES BEI SYMMETRISCHER SPULENANORDNUNG

(ON THE HOMOGENEITY OF THE MAGNETIC FIELD IN THE CASE OF SYMMETRICAL ARRANGEMENT OF COILS)

By G. Fanselau

Zeitschrift fur Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 236-237.

In one of his previous papers the author based his calculations concerning coil-aggregates used for producing homogeneous magnetic fields on equal number of turns and equal current of the coils. By giving up this supposition sometimes more suitable constructive arrangement can be obtained.--Author's abstract translated by W. Ayvazoglou.

(1705) STUDIE ÜBER DIE LUFTELEKTRISCHE POTENTIALGEFÄLLE UND DESSEN UNRUHE UNTER BESONDERER BERÜCKSICHTIGUNG DES EINFLUSSES EINER GROSSSTADT

(STUDY CONCERNING THE POTENTIAL DROP OF ATMOSPHERIC ELECTRICITY AND ITS DISTURBANCE TAKING ESPECIALLY INTO CONSIDERATION THE INFLUENCE OF LARGE CITIES)

By Heinrich Kuhn

Zeitschrift für Geophysik, Braunschweig, vol. 9, No. 4/5, 1933, pp. 238-252.

Contents of the article:

1. Introduction.

2. Description of the places of measurements: (a) Meteorologic - Geophysical Institute; (b) aerodrome meteorological observatory; (c) Taunus observatory.

3. Periods of the potential drop: (a) Annual course in the city and on the aerodrome; (b) diurnal course in the city, on the aerodrome and at the Taunus observatory; (c) explanation concerning the annual and the diurnal course.

4. Potential drop and direction of the wind in the city and on the aerodrome.

5. Potential drop and atmospheric bodies in the city and on the aerodrome.

6. Definition of the disturbance.--W. Ayvazoglou.

(1706) THE INTERPRETATION OF THE RESISTIVITY PROSPECTING METHOD FOR HORIZONTAL STRUCTURES

By L. B. Slichter

Physics, Lancaster, vol. 4, No. 9, 1933, pp. 307-322.

The direct problem of deducing from electrical potentials observed at the surface of a horizontally uniform earth the unknown variation of the conductivity with depth reduces to a boundary-value problem of unusual type. Its solution for the isotropic case is developed in part I. In part II the more usual inverse problem is solved for some special classes of conductivity functions, and graphic examples are given as an aid in guiding the interpretation work. In part III the anisotropic case is discussed.--Author's abstract.

(1707) AUSBREITUNG ELEKTROMAGNETISCHER FELDER LÄNGS FLUSSLÄUFEN

(EXPANSION OF ELECTROMAGNETIC FIELDS ALONG THE COURSES OF RIVERS)

By Volker Fritsch

Hochfrequenztechnik und Elektroakustik, Leipzig,
vol. 41, No. 3, 1933, pp. 100-104.

Experiments proved that the long waves were more easily absorbed by the mountains than the short ones.

The conductivity effect of watercourses with regard to the electric waves was examined, and the author established that short waves were influenced by these watercourses considerably more than long waves. The results of previous observations concerning geographical, geological, and meteorological conditions were verified in 1932 during a 1,400-km long trip on the Danube.--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1708) THE HARDEST COSMIC RAYS AND THE ELECTRIC CHARGE OF THE EARTH

By W. Kolhörster

Nature, London, vol. 132, No. 3332, 1933, p. 407.

The note published by Kolhörster in this number of Nature reads as follows:

> Some years ago I detected the coincidences of cosmic radiation by placing two Geiger-Müller tube counters above one another and side by side. Repeating this experiment in the salt mine of Stassfurt in different levels, systematic coincidences were still found in the first level, whereas in the 4th level no coincidences occurred within 3 hours. The coinciding corpuscular radiation in the first level--that is, at a depth equivalent to 500 m of water--is predominantly directed in the vertical, the mass-absorption coefficient (μ/ρ) H_2O being less than 5×10^{-5} cm^2 gm^{-1}, and the minimum energy greater than 10^{11} e-volt. Earlier experiments with ionization chambers suggested that the radiation penetrates to 700 to 800 m of water, which is not confirmed by further coincidence experiments. These rays are doubtless cosmic rays, at least four times harder than the hardest component found by Regener at a depth of 230 m in Lake Constance. On account of their energy and penetrating power and for other reasons, such as smallness of latitude effect and so on, they may perhaps represent the primary cosmic radiation. Leaving the small number of incident rays out of the question for the present, a radiation has been found, which has the properties needed for a corpuscular penetrating cosmic radiation capable of maintaining the electric charge of the earth.

(1709) RADIO ENTDECKT UNTERIRDISCHE HÖHLEN

(RADIO DISCOVERS SUBTERRANEAN CAVES)

By Volker Fritsch

Umschau, Frankfurt am. Main, vol. 37, No. 29, 1933, pp. 555-557.

The author describes the results of his investigations carried out by radio-waves in the caves formed by the Punkwa River near the city of Blansko, north of Brünn (Moldavia), to determine the underground course of this river. A short-wave sender was set up in one of the caves (Erichshöhle), and the intensity of the sound was measured at many points of the cave-area by means of a transportable receiver.

Maps showing the established course of the river are given. The author expects to continue his investigations by using ultrashort waves.--W. Ayvazoglou.

(1710) THE COSMIC RAY HODOSCOPE

By Thomas H. Johnson and E. C. Stevenson

Journal of the Franklin Institute, Lancaster, Pa.,
vol. 216, No. 3, 1933, pp. 329-337.

The authors describe an instrument, called by them a "cosmic ray hodoscope", which may be of interest to those working on radioactivity, as it serves for observing and studying the detailed phenomena of the cosmic radiation by making visible the paths of the penetrating corpuscular rays through a continuous region of space. It consists of a large number of small Geiger-Müller cylindrical counters stacked in a two-dimensional array or bank and thus filling, except for the interstices, the sensitive volume of the instrument. Diagrams showing: (1) Simple circuit for producing flashes from a counter discharge, (2) geometrical arrangement of the 72-element hodoscope, (3) complete circuit diagram of the hodoscope, and (4) an individual counter mounting are given. Photographs of the original 36-element hodoscope, a 72-element hodoscope, and a straight track photographed with the 36-element hodoscope are added.--W. Ayvazoglou.

(1711) THE RADIUM CONTENT OF THE KEWEENAWAN BASALTS AND SOME ACCESSORY MINERALS

By Wm. D. Urry

Proceedings of the American Academy of Arts and Sciences, Boston,
vol. 68, No. 4, 1933, pp. 125-136.

1. The distribution of radium in the Keweenawan rocks and minerals has been determined by analyses of a series of specimens from known locations and positions in the copper mines and basaltic flows of Keweenaw Point, Mich.

2. Evidence of correlation between the radium content and both depth and stratigraphic arrangement has been found.

3. An average value for the radium content of "plateau basalt" as exemplified by the Keweenawan flows is given.

4. There is evidence of a regular order in the radium content of the accessory minerals in the copper lodes, according to the method of precipitation from the mineralizing solutions. More data are required on this point.--Author's abstract.

(1712) THE OCCURRENCE OF RADIUM, URANIUM, AND POTASSIUM IN THE EARTH

By Wm. D. Urry

Proceedings of the American Academy of Arts and Sciences, Boston,
vol. 68, No. 4, 1933, pp. 137-144.

1. A probable distribution of the radium and uranium throughout the earth is given, basing the computations on Washington's proposed mineralogical and chemical structure and using the latest determinations for composite samples and analytical series.

2. The results show a considerably lower mean uranium content than has usually been adopted for the three outer shells and exclude the possibility of a complete concentration into the upper two shells, a conclusion that is in good agreement with Holmes' theory of convection currents in the substratum.--Author's abstract.

(1713) DESCRIPTION D'UN APPAREIL DE MESURE DE SUBSTANCES RADICACTIVES NE NECÉSSITANT PAS LA CONNAISSANCE PRÉCISE DE LA POSITION DE LA SUBSTANCE

(DESCRIPTION OF AN APPARATUS FOR THE MEASUREMENT OF RADIOACTIVE MATERIALS WHICH DOES NOT REQUIRE THE EXACT KNOWLEDGE OF THE LOCATION OF THE MATERIAL)

By A. Piccard and L. Meylan

Le Journal de physique et le radium, Paris, vol. 4, No. 2, 1933, pp. 105-108.

The apparatus consists of an ionization chamber formed by two plane parallel plates of large area. A lead disk of uniform thickness is placed on the upper plate. The preparation is placed at the center of the lead disk. The effect of a small displacement of the preparation upon the results of the measurement decreases with the thickness of the lead. With a lead thickness of 1 to 2 cm, a displacement of 4 cm in the position of the preparation in any direction produces a variation of the ionization current less than from 0.2 to 0.3 percent. Therefore, under these conditions, an uncertainty of 4 cm in the position of the radioactive material causes an error in measurement less than from 0.2 to 0.3 percent.--Author's abstract translated by W. Ayvazoglou

6. GEOTHERMAL METHODS

(1714) ROCK TEMPERATURES AND SOME VENTILATION CONDITIONS IN THE MINES OR NORTHERN ONTARIO

By Ralph H. Cleland

The Canadian Mining and Metallurgical Bulletin, Montreal,
No. 256, 1933, pp. 379-407.

This paper is a resume of a brief survey of rock temperatures made by the Ontario Department of Mines during 1932. Present temperatures were recorded, and the geothermal gradients that now exist were determined.

The geothermometer used is described, and details of instruments for measuring rock temperatures are shown in a diagram.

Geological summaries and temperature conditions in the following districts are given: (1) Porcupine district; (2) Kirkland Lake district; and (3) Sudbury district - Frood mine.

Excerpts from various articles showing rock-temperature conditions in other places are given. The two last chapters deal with the geothermal gradient variations and the underground air conditions.--W. Ayvazoglou.

(1715) THERMAL HISTORY OF THE CRUST

By J. S. DeLury

Transactions of the Royal Society of Canada, Ottawa,
Sect. IV, vol. 27, May 1932, pp. 277-288.

The fact that thermal gradients in the crust are extremely variable is shown in a table. The variations are so great that, according to the author, it may be safely assumed that some regions are losing several times as much heat from a unit area of surface as other regions.

The second part of the author's Summary and Conclusions reads as follows:

> What inferences may be drawn from the temperature gradients which have been observed in the Canadian shield? They are 3 to 4 times lower than the average commonly adopted in geothermal and other geophysical calculations. Adiabatic expansion accompanying the post-glacial elevation of the shield would be offset by the rise of isogeotherms and could not in any case explain the extremely low gradients. Have estimates of the importance of radiothermal energy been exaggerated, and must they be revised? The continental crust is built largely of intrusive plutonic sial of different ages. Is it mere accident that the lowest temperature gradients are in the oldest sial, the highest in the present Hinge zone and the intermediate gradients in the regions between, such as the Hercynian bows?

The writer fails to find an explanation of these facts and answers to these questions in the currently accepted geological principles and is forced to the following tentative conclusions:

The earth's crust has a thermal history which is in large measure distinct from that of the earth as a whole. Isogeotherms are very irregular in the crust, but are probably increasingly smooth with depth. The measure of the loss of the earth's internal heat (connate and radioactive) by conduction to the surface is probably more safely supplied by the lowest thermal gradients so far determined in the crust, rather than by the average gradient. Heat is developed in the sub-crust in enormous quantities by subsidence. The heat-equivalent of the sum of subsidences might easily meet the requirements for the building of an igneous crust during geological time. Subsidence leads to sheet-flow in a horizontal direction beneath the crustal carapace, and the viscous sheet-flow rises along lines of weakness in the crust to become less viscous magma and mobile lava at higher levels. Past and present thermal conditions in the crust are decidedly anomalous under any other hypothesis known to the writer, unless the "convection" hypothesis offers an explanation.

Distortion is needed, and heat seems to be the only great source of energy available for distorting the body of the earth. If an upward convection current were ever started in the body of the earth it would be on a wide front and would produce a bulge on the surface. Before a subcrustal horizontal convection current could set in, the bulge would be so high that an isostatic adjustment would be forced, and the horizontal current would be an isostatic sheet-flow. The writer believes, however, that a solid distortion may be developed and dissipated long before convection could come into play. A temperature rise of a few degrees in a continuous earth shell, not necessarily a thick one, could produce a bulge of distortion at the surface large enough to meet the requirements of crustal movements.

7. UNCLASSIFIED METHODS

(1716) BEMERKUNG ÜBER DIE MÖGLICHKEIT DER AUFSUCHUNG EINES GRUNDWASSERSPIEGELS IN TROCKENEN GEGENDEN DURCH MESSUNG DER RELATIVEN FEUCHTIGKEIT IM BODEN

(REMARK ON THE POSSIBILITY OF FINDING UNDERGROUND-WATER HORIZON IN ARID COUNTRIES BY MEASURING THE RELATIVE HUMIDITY IN THE GROUND)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 3, No. 4, 1933, pp. 531-533.

The problem of how to find underground water by measuring the relative humidity in the ground is discussed. A numerical example is given, and the simple experimental execution of the measurements by means of an automatically registering hygrometer (constructed by Lambert or Simens) is explained.--W. Ayvazoglou.

(1717) GEOPHYSICAL-PROSPECTING EXHIBIT

EDITORIAL NOTE

(The Mines Magazine, Golden, Colorado, vol. 23, No. 10, 1933, pp. 8 - 9.

A brief description of the main features of the exhibit prepared at the plorado School of Mines for the Century of Progress is given.

A complete description, together with an elementary outline of geophysical ethods, is given in the new Quarterly of the school (vol. 28, No. 4, 1933), ntitled Elements of Geophysical Prospecting.--W. Ayvazoglou.

(1718) SIXTY-THREE DISCOVERIES OF POOLS ON GULF COAST ARE CREDITED TO THE USE OF GEOPHYSICS

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 32, No. 20, 1933, pp. 10-11 and 34.

The importance of geophysics in the present coastal exploration program s indicated in the amount of money being spent in the use of instruments. onservative figures and estimates have been compiled which show that in the ulf coast proper alone at least $350,000 is being put out each month to carry n this geophysical exploration, not including any instrument investment or st of acreage. There now are between 75 and 100 crews working actively on he coast. Reflection-machine and torsion-balance crews head the list. There re also several gravitometer and magnetometer crews and one pendulum crew.

The accompanying list of geophysical discoveries includes only those hich have been definitely proved to exist, this proof being the actual development of production, the drilling into cap rock or salt, or the encountering of showings of sufficient importance to indicate the existence of a field. f the 63 discoveries, 45 have been proved productive. It is of particular ote that the geophysical prospects have been proved up with comparatively ittle exploration in contrast to the extensive wildcatting which took place efore the opening of production on some of the older domes.

Geophysics, according to the author, is now so interwoven into Gulf coast evelopment methods that it is difficult to list or segregate all the geohysical accomplishments.--W. Ayvazoglou.

9. NEW BOOKS

(1719) Gutenberg, Dr. B. Handbuch der Geophysik (Handbook of Geophysics), vol. 2, part 3: The Surface of the Earth, by Dr. E. Kossinna; Petrographic Structure of the Crust of the Earth, by Dr. S. Rosch; Chemistry of Meteorites, by Dr. von Hevesy. Paper covers, pp. 869-1,119, illustrated. Subscription price, R.M. 28. Vol. 7, part 1: The Ice of the Earth, by Dr. Hess; Seas, by Dr. Halbfass; The Underground Water, by Dr. Koehne. Paper covers, pp. 1-252, illustrated. Subscription price, R.M. 28. Berlin. Gebrüder Borntraeger.

(1720) Maurain, Ch., Annales de l'Institut de Physique de Globe de l'Universite de Paris et du Bureau Central de Magnetisme Terrestre, vol. 11, 1933, 174 pp., Paris, Les Presses universitaires de France, 49, Boulevard St. Michel. Contents of the book: (1) Magnetic Observations Made at the Observatory of Val-Joyeux during 1931, by L. Eble; (2) Magnetic Observations Made at the Observatory of Nantes during 1931, by E. Tabesse; (3) Errata Concerning the Note on the Magnetic Network in France of January 1, 1924; (4) Electric Field Observations Made at Val-Joyeux during 1931, by Ed. Salles; (5) Resume of seismological Observations Made at the Observatory of Parc Saint-Maur in 1931, by C. E. Brazier and L. Genaux; (6) Resume of Meteorological Observations Made at the Observatory of Parc Saint-Maur in 1931, by C. E. Brazier; (7) Resume of Actinometric Observations Made at the Observatory of Parc Saint-Maur in 1931, by C. E. Brazier; (8) Comparison Effectuated between the Silver-Disk Pyrheliometer S.I. 40 and the Angström Pyrheliometer No. 40, by F. Volochine, C. E. Brazier and R. Guilhen; (9) Magnetic Observation in Syria (II), by Jean Chevrier; (10) Measurements of Atmospheric Ionization, by Leonardo Martinozzi; (11) Declination in Indo-China, by G. Homery; (12) Study of the Electrical Conductivity of the Atmospheric Air during a Journey in Greenland, by Ch. Maurain and J. Devaux; (13) Study of the Atmospheric Air Condensation-Nuclei during a journey in Greenland, by Ch. Maurain and J. Devaux; (14) Study of the Global Radiation in Greenland (Scoresby Sund), by Ch. Maurain and J. Devaux; (15) Analysis of Diagrams Resulting from the Superposition of the Sine-Curve upon the Variable Amplitude, by H. Labrouste; (16) Magnetic Properties of Sedimentary Rocks in the Basin of Paris, by O. Thellier; (17) Measurements of Magnetic Declinations in Madagascar and Their Relation to the Geological Phenomena; (18) Erratum to Volume X (note by Kostizin); (19) Deep Geology of France According to the New Magnetic Network and the Gravity Measurements, by Jean Jung; (20) Some Remarks Concerning H. Labrouste's Method of Harmonic Analysis, by J. Coulomb; (21) Principal Magnetic Perturbations in 1931 (Diagrams Obtained from the Records in Val-Joyeux).

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